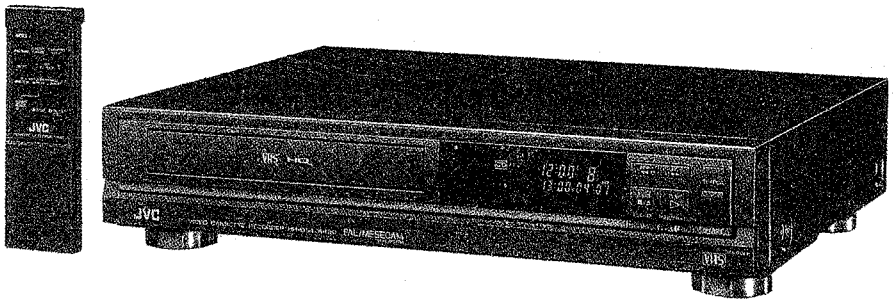
JVC

SERVICE MANUAL

VIDEO CASSETTE RECORDER VHS

HR-D542A(DK)



SPECIFICATIONS

GENERAL

Power requirement	:	AC 110 — 240 V~, 50/60 Hz
Power consumption	:	21 W
Temperature	:	5°C to 40°C (Operating)
	:	–20°C to 60°C (Storage)
Operating position	:	Horizontal only
Dimensions (WxHxD)	:	435 x 94 x 322 mm
Weight	:	5.3 kg
Format	:	VHS PAL standard
Tape width	:	12.65 mm
Tape speed	:	23.39 mm/sec
Maximum recording time	:	240 min. with E-240 video cassette

VIDEO

Signal system	:	PAL colour and CCIR monochrome signals, 625 lines/50 fields (See "WARNING")
Recording system	:	Rotary, slant azimuth two-head helical scan system
Input	:	0.5 to 2.0 Vp-p, 75 ohms, unbalanced
Output	:	1.0 Vp-p, 75 ohms, unbalanced
Signal-to-noise ratio	:	43 dB (Rohde & Schwarz noise meter)
Horizontal resolution	:	250 lines

AUDIO

Recording system	:	Longitudinal track
Input	:	Line: –8 dBs, 50 k-ohms, unbalanced
Output level	:	–6 dBs, high impedance load
Output impedance	:	Less than 1 k-ohm, unbalanced
Frequency range	:	70 Hz to 10,000 Hz

TUNER

Tuning system	:	Voltage synthesized tuner
TV channel storage capacity	:	48 positions (+ AUX position "AU")
Channel coverage	:	VHF 47 — 111 MHz 111 — 300 MHz UHF 470 — 862 MHz
Aerial output	:	UHF channel 36 (adjustable 32 — 40)

TIMER

Clock reference	:	Quartz-crystal
Programme capacity	:	1-year/8-programme timer
Memory back-up time	:	60 min.

ACCESSORIES

Provided accessories	:	Aerial cable, Infrared remote control unit, "R6" battery x 2, Video cassette tape

Design and specifications subject to change without notice.

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No. 82199
November 1990

NOTE: For a technical description, please refer to Technical Guide VTG82052 HR-D540/D580/D660 PAL.

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Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

● Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded (▒▒) parts are critical for safety.
   Replace only with specified part numbers.
   Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Fuse replacement caution notice.
   Caution for continued protection against fire hazard.
   Replace only with same type and rated fuse(s) as specified.

4. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

5. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers
   4) Insulation sheets for transistors
   5) Barrier

6. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

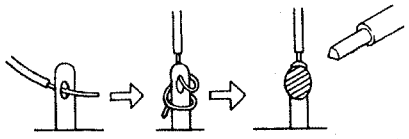


Fig. 1

7. Observe that wires do not contact heat producing parts (heat-sinks, oxide metal film resistors, fusible resistors, etc.)

8. Check that replaced wires do not contact sharp edged or pointed parts.

9. When a power cord has been replaced, check that 10—15 kg of force in any direction will not loosen it.

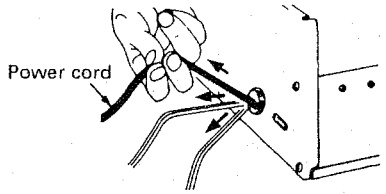


Fig. 2

10. Also check areas surrounding repaired locations.

11. Products using cathode ray tubes (CRTs)
    In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

12. Crimp type wire connector
    In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.

    1) **Connector part number** : E03830-001
    2) **Required tool** : Connector crimping tool of the proper type which will not damage insulated parts.
    3) **Replacement procedure**
       (1) Remove the old connector by cutting the wires at a point close to the connector.
       Important : Do not reuse a connector (discard it).

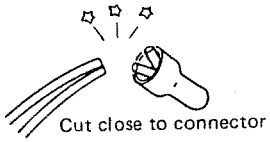


Fig. 3

(2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

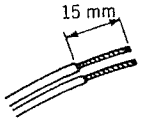


Fig. 4

(3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

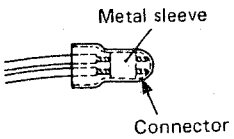


Fig. 5

(4) As shown in Fig. 6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

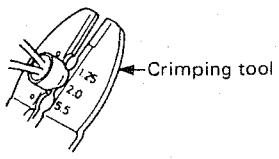


Fig. 6

(5) Check the four points noted in Fig. 7.

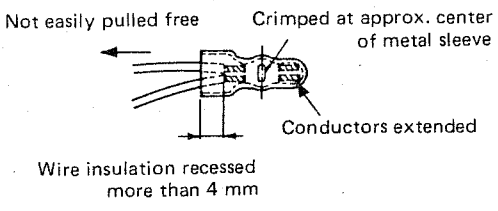

Not easily pulled free
Crimped at approx. center of metal sleeve
Conductors extended
Wire insulation recessed more than 4 mm

Fig. 7

● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions, Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. Insulation resistance test

Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

2. Dielectric strength test

Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

3. Clearance distance

When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table 1 below.

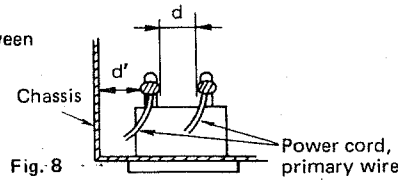


Fig. 8

4. Leakage current test

Confirm specified or lower leakage current between earth ground/power cord plug prongs and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

Measuring Method: (Power ON)

Insert load Z between earth ground/power cord plug prongs and externally exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure 9 and following table 2.

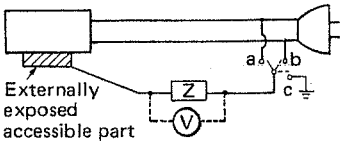


Fig. 9

5. Grounding (Class I model only)

Confirm specified or lower grounding impedance between earth pin in AC inlet and externally exposed accessible parts (Video in, Video out, Audio in, Audio out or Fixing screw etc.).

Measuring Method:

Connect milli ohm meter between earth pin in AC inlet and exposed accessible parts. See figure 10 and grounding specifications.

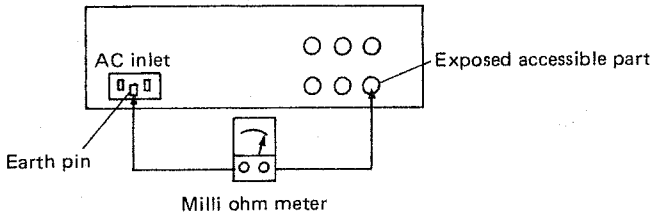


Fig. 10

Grounding Specifications

Region	Grounding Impedance (Z)
USA & Canada	Z ≦ 0.1 ohm
Europe & Australia	Z ≦ 0.5 ohm

AC Line Voltage	Region	Insulation Resistance (R)	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	R ≧ 1 MΩ/500 V DC	AC 1 kV 1 minute	d, d' ≧ 3 mm
100 to 240 V			AC 1.5 kV 1 minute	d, d' ≧ 4 mm
110 to 130 V	USA & Canada	—	AC 900 V 1 minute	d, d' ≧ 3.2 mm
110 to 130 V 200 to 240 V	Europe & Australia	R ≧ 10 MΩ /500 V DC	AC 3 kV 1 minute (Class II) AC 1.5 kV 1 minute (Class I)	d ≧ 4 mm d' ≧ 8 mm (Power cord) d' ≧ 6 mm (Primary wire)

Table 1 Specifications for each region

AC Line Voltage	Region	Load Z	Leakage Current (i)	a, b, c
100 V	Japan	1 kΩ	i ≦ 1 mA rms	Exposed accessible parts
110 to 130 V	USA & Canada	0.15 μF, 1.5 kΩ	i ≦ 0.5 mA rms	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe & Australia	2 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Antenna earth terminals
		50 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Other terminals

Table 2 Leakage current specifications for each region

Note: These tables are unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

INSTRUCTIONS

SAFETY PRECAUTIONS

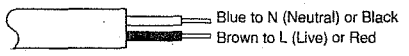
The rating plate and the safety caution are on the rear of the unit.

WARNING — DANGEROUS VOLTAGE INSIDE
WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

IMPORTANT (In the United Kingdom)
Mains Supply (240 V~, 50 Hz only)

IMPORTANT

Do not make any connection to the Larger Terminal coded E or Green. The wires in the mains lead are coloured in accordance with the following code:



If these colours do not correspond with the terminal identifications of your plug, connect as follows:
Blue wire to terminal coded N (Neutral) or coloured Black.
Brown wire to terminal coded L (Live) or coloured Red.
If in doubt — consult a competent electrician.

Omkopplaren OPERATE på denna apparat är sekundärt kopplad och skiljer inte apparaten från nätet i läge OPERATE OFF.

The OPERATE button does not completely shut off mains power from the unit, but switches operating current on and off.

BEMAERK: I stilling OFF er apparatet stadig forbundet med lysnettet Hvis det ønskes fuldstændig afbrudt skal netledningen trækkes ud.

This unit is produced to comply with Directives 76/889/EEC, 82/499/EEC, 87/308/EEC and Standard IEC Publ. 65.

Power SYSTEM
This set operates on voltage of AC 110 – 240 V~, 50/60 Hz with automatic switching.

CAUTION

- When you are not using the recorder for a long period of time, it is recommended that you disconnect the power cord from the AC outlet.
- Dangerous voltage inside. Refer internal servicing to qualified service personnel. To prevent electric shock or fire hazard, remove the power cord from the AC outlet prior to connecting or disconnecting any signal lead or aerial.

WARNING

1. In addition to PAL B/G and PAL D/K colour television signals, this recorder can also receive SECAM B/G and SECAM D/K colour television signals. SECAM B/G and SECAM D/K colour television signals can be recorded and played back in colour as far as this same recorder is used for recording and playback.
2. SECAM B/G and SECAM D/K colour television signals recorded on this recorder produce monochrome pictures if played back on another PAL or SECAM recorder.
3. SECAM B/G and SECAM D/K colour television signals recorded on another PAL or SECAM recorder produce monochrome pictures if played back on this recorder.
4. This recorder cannot be used in France. Use in France a recorder which is capable of receiving SECAM L colour television signals.
5. SECAM L prerecorded cassettes or recordings made with a SECAM L video recorder produce monochrome pictures when played back on this recorder.

IMPORTANT: It may be unlawful to record or play back copyrighted material without the consent of the copyright owner.

VHS PAL HQ

- Only cassettes marked "VHS" can be used with this video recorder.
- HQ VHS is compatible with existing VHS equipment.

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PRECAUTIONS

VIDEO RECORDER

Handling and storage

- Avoid using the recorder under the following conditions:
  - — extremely hot, cold or humid places,
  - — dusty places,
  - — near appliances generating strong magnetic fields,
  - — places subject to vibrations, and
  - — poorly ventilated places.
- Be careful of moisture condensation.
- Avoid using the recorder immediately after moving from a cold place to a warm place. The water vapour in warm air will condense on the still-cold video head drum and tape guides and may cause damage to the tape and the recorder.
- Handle the recorder carefully
  - Do not block the ventilation openings.
  - Do not place anything heavy on the recorder.
  - Do not place anything which might spill and cause trouble on the top cover of the recorder.
  - Use in horizontal (flat) position only.
- In case of transportation,
  - Avoid violent shocks to the recorder during packing and transportation.
  - Before packing, be sure to remove the cassette from the recorder.

Moisture condensation

- If you pour a cold liquid into a glass, water vapour in the air will condense on the surface of the glass. This is called moisture condensation.
- Moisture condensation on the head drum, one of the most crucial parts of the video recorder, will cause damage to the tape.
- Moisture condensation is apt to occur under the following conditions:
  - — when the recorder is moved from a cold place to a warm place, and
  - — under extremely humid conditions.
- In conditions where moisture condensation may occur, keep the power cord plugged in an AC outlet and the power switched on; this will help prevent condensation from occurring. When condensation has occurred, it will not evaporate quickly once the power is switched on. Wait a few hours for the recorder to become dry.

VIDEO CASSETTES

- Avoid exposing the cassettes to direct sunlight. Keep them away from heaters.
- Avoid extreme humidity, violent vibrations or shocks, strong magnetic fields (near a motor, transformer or magnet) and dusty places.
- Place the cassettes in cassette cases and position vertically.

REMOTE CONTROL UNIT

- Avoid violent shocks, especially take care not to drop the unit.
- Take care not to allow liquid to spill into the unit.
- Do not place heavy objects on the unit.
- Avoid leaving the unit in places subject to direct sunlight or extremely high temperatures.

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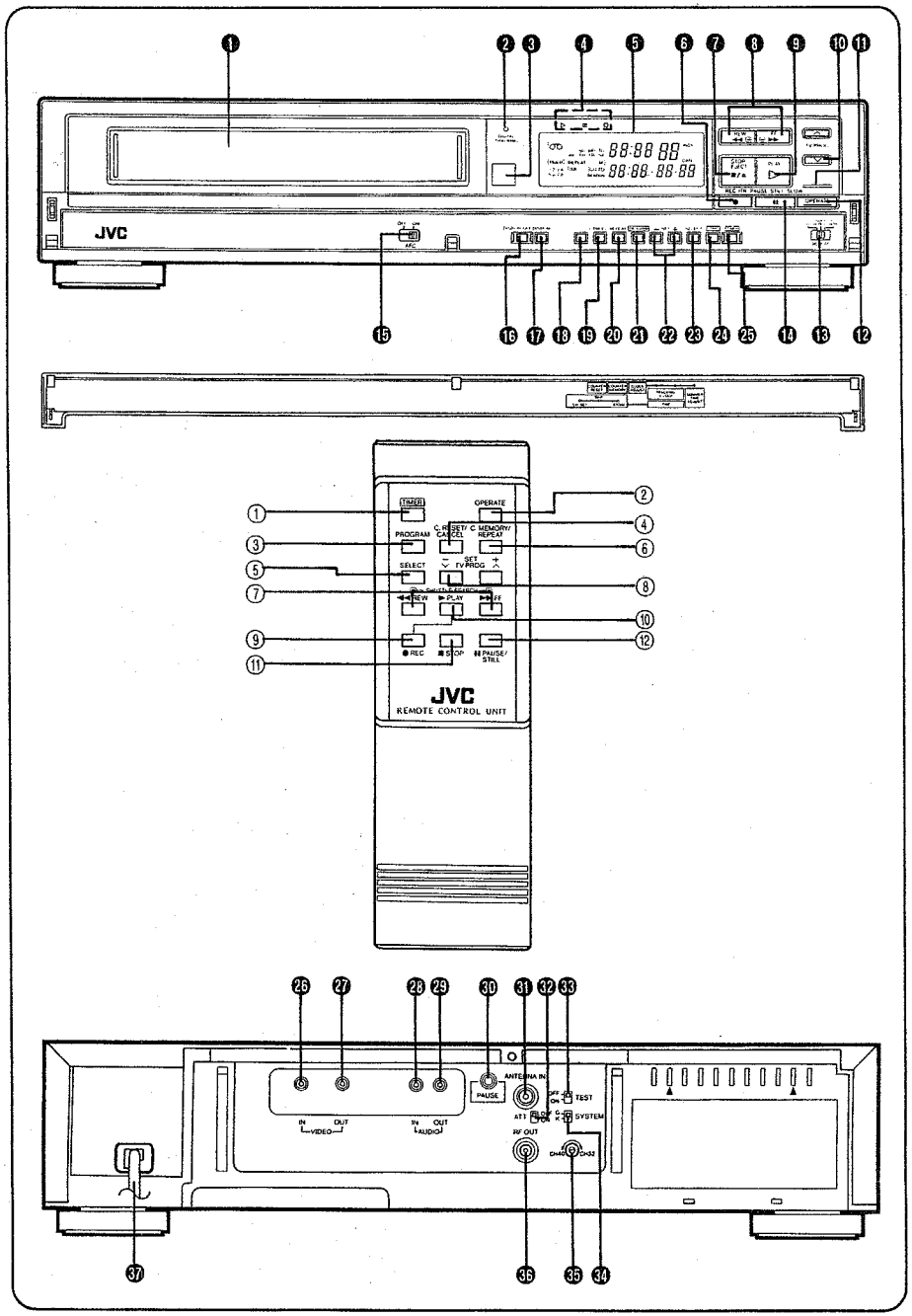


FEATURES

MAIN FEATURES, ADVANTAGES AND BENEFITS

Feature	Advantage	Benefit
Quick-Response Full-Loading Mechanism	■ Quick response: 1.3 seconds from Stop to Play or Record. ■ Increased Rewind/Fast-Forward speed.	■ Immediate, no-frustration operation of VCR. ■ Faster Rewind/Fast-Forward saves time.
Digital Tracking	Microcomputer-controlled tracking system maintains constant optimal video tracking.	Best possible picture performance, even for rental videos, is always assured.
Automatic Repeat Playback (possible up to 5 times)	■ Full Repeat: repeated playback of whole tape. ■ Index Repeat: repeated playback of segment located between two index codes.	You can repeatedly view a favourite programme with ease.
Dual-system Flexibility	■ PAL/MESECAM recording and playback. ■ Voltage synthesized wide-band dual tuner with automatic detection of B/G and D/K broadcasts (both PAL and SECAM) and 48-channel preset capacity; can receive VHF and UHF channels. ■ G/K dual-system RF converter.	■ Access to a wider range of programmes. ■ Increased television compatibility.

OTHER KEY FEATURES

Flexible timer functions — Timer programming flexibility thanks to 1-year/8-event timer, 24-hour instant timer, and "off" timer.
Quartz clock — Ensures accurate timekeeping/timer recording even in areas where power fluctuations occur.
Instant "summer time" adjustment — One-button adjustment of VCR's clock to and from daylight saving time.
Child Lock system — Temporarily disables VCR's controls to deter unwanted operation.
Display OFF function — Can switch off FDP to eliminate bothersome light and reduce chances of theft.
Preroll-capable PAUSE remote control terminal — For superior quality edits when used in an editing suite.
Multi-voltage operation with automatic switching — 110 to 240 V AC.

CONTROLS, INDICATORS AND CONNECTORS

Refer to diagrams on the front foldout page.

Front panel

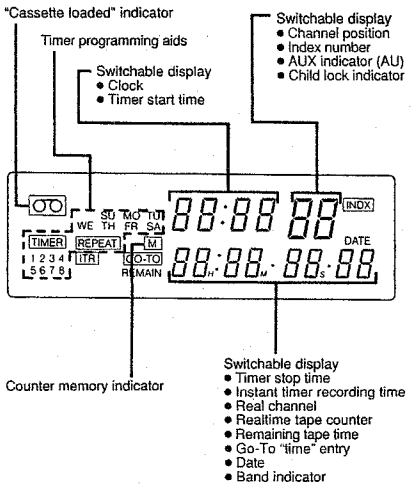
❶ Cassette loading slot
Insert a VHS cassette. The door will close and the "cassette loaded" indicator will appear on the FDP (fluorescent display panel).

❷ DIGITAL TRACKING indicator
Lights in the Digital Tracking mode.
Blinks while adjusting.

❸ Infrared beam receiving window

❹ Mode indicators
- ▷ : Play mode
- ▷ ▯▯ : Still/Slow-Motion mode
- ▷ ○ : Record mode
- ▷ ▯▯ ○ : Record-Pause mode

❺ Fluorescent Display Panel (FDP)



❻ REC/ITR button
- Press once to start recording.
- Press twice to engage the Instant Timer Recording mode.
- Also use to set the required recording time in the 24-Hour Instant Timer Set mode.

❼ STOP/EJECT button
- Press while in the Stop mode to eject the cassette.
- Press while in other modes to stop the tape.

❽ REW/FF/Shuttle Search buttons
- Press while in the Stop mode to rewind or fast-forward the tape.
- Press while in the Play mode for Shuttle Search in the reverse or forward direction.
- Press while in the Record-Pause mode to engage the Retake mode. (See page 14.)

❾ PLAY button
- Press to play back a tape.
- Press to cancel the Pause/Still/Slow or Shuttle Search mode. (See page 12.)
- Press to start recording from the Record-Pause mode.

❿ TV PROG. buttons
Press either button to scan to a desired channel.

⓫ OPERATE indicator

⓬ OPERATE button
Press to apply operating power to the recorder. The indicator will light. Loading a cassette also turns the power on.

⓭ REPEAT switch
FULL REPEAT: To play back the entire tape repeatedly.
INDEX REPEAT: To play back a segment between two adjacent index codes. (See page 11.)
OFF: No repeat playback.

⓮ PAUSE/STILL/SLOW button
- Press while in the Record mode to stop the tape temporarily to avoid recording of unwanted material.
- Press while in the Play mode to view a still picture.
- The still picture can be advanced each time this button is pressed.
- Keep this button pressed for more than 2 seconds to obtain slow-motion playback.
- Press again to view a still picture.

⓯ Automatic Frequency Control switch (AFC)
Normally set to ON.

⓰ DISPLAY OFF button
Press to make all indications on the FDP disappear when they are not required; the display will show "-:--". Press again to make the clock display reappear.

⓱ DISPLAY button
Press to switch the display among the realtime tape counter, remaining tape time and date. Also press to change the display from the Timer Set mode to the Clock mode.

⓲ CH.SET button
Press to engage the Real Channel mode.

⓳ CANCEL/COUNTER RESET/SKIP button
This is a triple-function button.
- as a CANCEL button — press to cancel the programmed data in the Timer Set mode.
- as a COUNTER RESET button — press to reset the realtime counter reading to "0H 00M 00S".
- as a SKIP button — press to skip unnecessary channels in the Real Channel mode.

⓴ REPEAT/COUNTER MEMORY/STORE button
This is a triple-function button.
- as a REPEAT button — press to enter the repeat command in the Timer Set mode.
- as a COUNTER MEMORY button — press to engage the Counter Memory mode.
- as a STORE button — press to store the tuned-in channel in the Real Channel mode.

㉑ PROGRAM/CLOCK ADJUST button
Press to change the recorder's mode in the following order: Clock mode, Timer Set mode, Clock Set mode, then return to the Clock mode.

㉒ SET/TRACKING/V. LOCK/FINE buttons (–/+)
These are quadruple-function buttons.
- as SET buttons — press to set the correct data in the Clock Set or Timer Set mode.
- as TRACKING buttons — press both to cancel the automatic Digital Tracking mode, then press either for manual tracking control. (See page 10.)
- as V. LOCK buttons — press either to reduce vertical vibrations, if observed in the Still mode.
- as FINE tuning buttons — press to shift the frequency in either direction to fine-tune in a specific station in the Real Channel mode.

㉓ SELECT/SUMMER TIME ADJUST button
This is a dual-function button.
- as a SELECT button — press to select the item to be set in the Clock Set, Real Channel or Timer Set mode.
- as a SUMMER TIME ADJUST button — press and quickly release to advance the clock by one hour, hold it pressed for 2 seconds to set the clock back by one hour. (See page 7.)

㉔ START button
Press to engage the 24-Hour Instant Timer Set mode. (See page 15.)

㉕ TIMER button
Press to engage the Timer Standby mode.

Rear Panel

㉖ VIDEO IN connector
Connect the video output of other video equipment such as another video tape recorder for recording video signals.

㉗ VIDEO OUT connector
Video signals being recorded or played back are available from this connector.

㉘ AUDIO IN connector
Connect an audio tape recorder or other audio sources for recording sound.

㉙ AUDIO OUT connector
Audio signals can be obtained from this connector.

㉚ PAUSE terminal
When using this recorder as the source player, connect to the PAUSE OUT terminal of a second VCR (if so-equipped) for synchronized preroll operation. This terminal can also be used for editing from a JVC VideoMovie camera/recorder using the Master Edit Control system.

㉛ Aerial input connector (ANTENNA IN)
Connect an aerial to this connector.

㉜ Attenuator switch (ATT.)
Set to OFF to receive broadcasts from distant stations. Set to ON to receive broadcasts of high field strength.

㉝ TEST signal switch
Set to ON when tuning your TV receiver for the video channel. A test signal in the form of two vertical white bars will be available.

㉞ SYSTEM select switch
Set this switch to match the broadcast system of your television receiver (G or K). If the colour TV broadcast system in your area is PAL B/G or SECAM B/G, set it to "G"; if the colour TV broadcast system in your area is PAL D/K or SECAM D/K, set it to "K".

㉟ RF converter frequency adjustment screw (CH40–CH32)
(See page 6.)

㊱ RF OUT connector
Connect to the aerial terminal of a TV receiver through the aerial cable (provided).

㊲ Power cord

Remote Control Unit

① TIMER button
Press to engage the Timer Recording Standby mode.

② OPERATE button
Press to turn the recorder power on or off.

③ PROGRAM button
Press to programme the timer.

④ C. RESET/CANCEL button
- Press to reset the realtime counter reading to "0H 00M 00S".
- Press to cancel the preset programme in timer programming.

⑤ SELECT button
Press to select the item to be set in time programming.

⑥ C. MEMORY/REPEAT button
- Press to engage the Counter Memory mode, "M" will appear on the FDP and the tape will stop automatically at the counter reading of "0H 00M 00S" when rewinding or fast-forwarding.
- Press to enter the repeat command in timer programming.

⑦ REW and FF (SHUTTLE SEARCH) buttons

⑧ SET (–/+)/ TV PROG. (∨/∧) buttons
Press to set to the correct date in timer programming or to select a desired channel.

⑨ REC button
Press together with the PLAY button ⑩ to start recording.

⑩ PLAY button

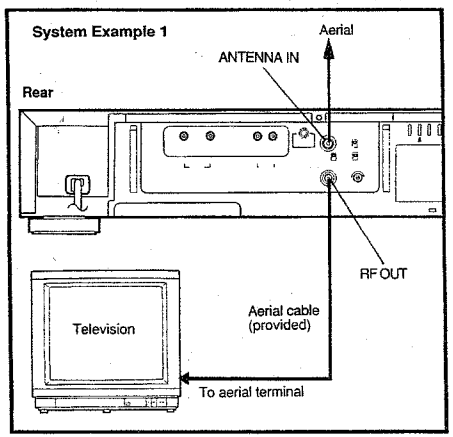
⑪ STOP button

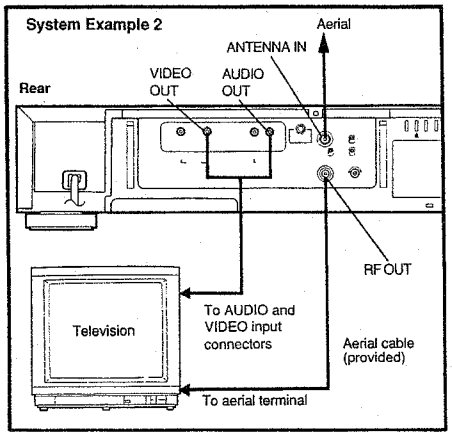
⑫ PAUSE/STILL button

Operating distance for remote control unit
- The maximum operating distance is about 8 m.

Installing the batteries
- Insert two "R6"-size batteries (provided) into the battery compartment on the rear of the remote control unit, observing correct polarity.

CONNECTIONS





AERIAL AND RF CONNECTION

1. Remove the aerial cable from the television and reconnect it to the recorder's ANTENNA IN connector. The recorder is then ready to record off-air programmes.
2. Connect the recorder's RF OUT connector to the television's aerial terminal using the provided aerial cable. The television is then ready to receive broadcast programmes. When you are not using the recorder, the TV signals are fed to the television via this terminal.
3. Set the SYSTEM select switch ⑭ to the appropriate position according to your TV system. (Refer to the chart below.)

Switch position	Colour TV broadcast system	Major countries
G	PAL B/G	Singapore, Thailand,Malaysia
	SECAM B/G	Iran, Iraq, Saudi Arabia
K	PAL D/K	China, Mongolia
	SECAM D/K	Bulgaria, Czechoslovakia, Hungary, Poland, Rumania, U.S.S.R.

- If your television is equipped with the aerial terminal only, you view tape programmes also via this terminal. In this case, set the television to UHF channel 36 (or a UHF channel adjusted as the video channel). See "VIDEO CHANNEL SETTING" below.

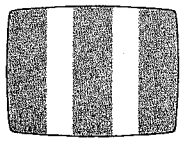
AV CONNECTION

- If your television is equipped with AUDIO and VIDEO input connectors, connect the recorder's AUDIO OUT and VIDEO OUT connectors to the television's AUDIO and VIDEO input connectors.
- To view tape programmes via these connectors, set the television to the AV mode.

Note:
For switching the television's input mode, refer to the instruction manual of your television.

VIDEO CHANNEL SETTING

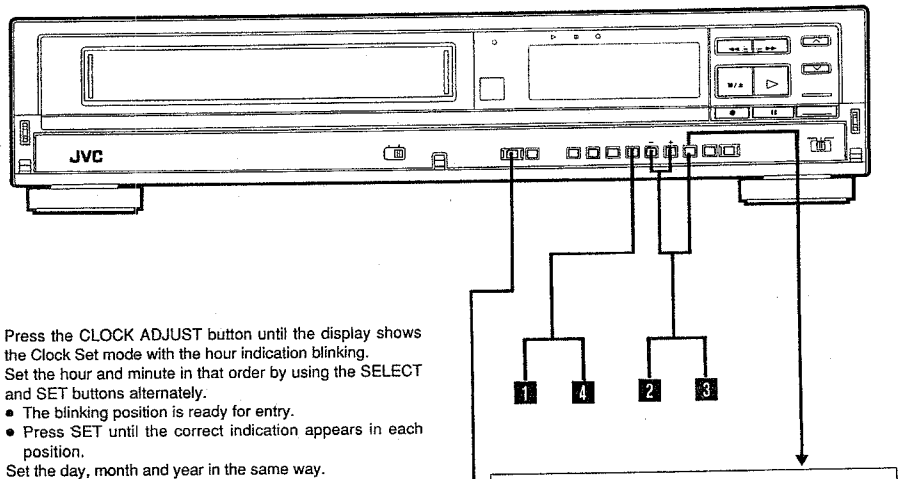
1. Press the OPERATE button ⑱ to turn the power on. Turn on the TV receiver.
2. Set the TEST switch ⑯ to ON.
3. Adjust your TV receiver in the vicinity of UHF channel 36 until you bring in the two white signal bars on the screen as illustrated. This is your VIDEO CHANNEL.
4. Reset the TEST switch to OFF.



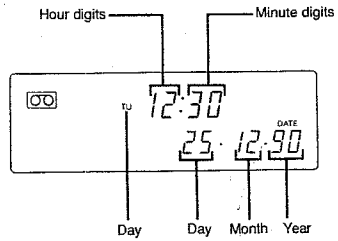
Notes:
- If some interference noise is seen on the screen because of broadcasts on neighbouring channels or if your preset broadcasts should be affected in picture quality, it is necessary to shift the RF converter output frequency from that of channel 36. Consult your JVC dealer for making this adjustment.
- Video channel setting is also possible using a prerecorded VHS video cassette. Play back the tape and tune the TV receiver to obtain clear pictures and sound while monitoring the playback picture on the TV screen.
- If your TV receiver is not provided with an AFC circuit, perform fine tuning of the TV receiver when you are actually viewing video cassettes.
- Set the SYSTEM select switch ⑭ to the appropriate position.

CLOCK SETTING

Plug the recorder into an AC outlet. The display shows a blinking 0:00.



1. Press the CLOCK ADJUST button until the display shows the Clock Set mode with the hour indication blinking.
2. Set the hour and minute in that order by using the SELECT and SET buttons alternately.
   - The blinking position is ready for entry.
   - Press SET until the correct indication appears in each position.
3. Set the day, month and year in the same way.
   - In year setting, set only the last two digits of the year.
4. Press CLOCK ADJUST.
   - Press it at the exact instant of the time signal, and the clock will be set accurately to the present time.
   - The day-of-the-week indication will be displayed automatically.



Notes:
- Clock setting is not possible in the timer recording standby mode. First check to see that the TIMER indicator on the FDP is not lit.
- Enter the data within 10 seconds after pressing the CLOCK ADJUST button.

SUMMER TIME ADJUST

This convenient feature is for quickly making the annual clock adjustment to the "summer time" (daylight saving time) setting, and back to regular time later.

1. Simply press and quickly release the SUMMER TIME ADJUST button in the Clock Set mode to set the clock forward by one hour.
2. Later in the year, to switch back to regular time, simply hold the SUMMER TIME ADJUST button pressed for 2 seconds to set the clock back by an hour.

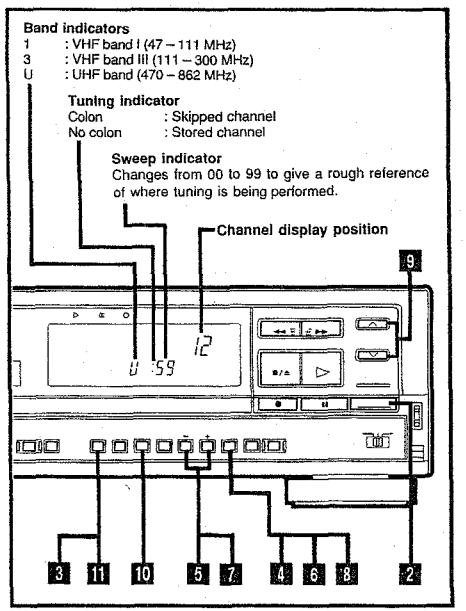
DISPLAY OFF

Press the DISPLAY OFF button to make all indications on the FDP disappear when they are not required; the display will show "-:--". Press again to make the clock display reappear.

Power failure indicator
The blinking 0:00 (initial condition of the display) is also a power failure indicator, showing that there has been a power failure exceeding about 60 minutes. Readjusting the time restores the normal condition of the clock display.

OPERATING THE BUILT-IN TUNER

This recorder incorporates a voltage synthesized tuner with 48-channel preset capacity. Only channels stored can be called up with the TV PROG. buttons in modes other than Channel Set. In the Channel Set mode, all channel numbers including skipped ones are successively displayed so that they can be stored or skipped.



Storing channels

1. Turn on the TV receiver and adjust it to your video channel.
2. Turn on the recorder.
3. Press CH. SET.
4. Press SELECT.
   - The band indicator will blink.
5. Press SET until the correct band indication appears.
6. Press SELECT.
7. Press SET until the desired broadcast signal is detected; use either the "–" or "+" button depending on the direction of search.
   - The sweep indicator will count down or up.
8. Press SELECT.
   - The channel position display will blink.
9. Press the TV PROG. buttons ∨ or ∧ to select the programme number you wish to use for the broadcast signal selected.
10. Press STORE. The "colon" will disappear.
    - Repeat steps 4 through 10 for all necessary channels.
11. Press CH. SET to disengage the Channel Set mode.
    - Stored channels will be called up during up/down scanning with the TV PROG. buttons.

Skipping channels

1. Press TV PROG. to select the channel to be skipped.
2. Press CH. SET.
   - The band indicator and the sweep indicator corresponding to the broadcast stored in that channel will appear.
3. Press SKIP ⓯. The "colon" will appear.
4. Press CH. SET to disengage the Channel Set mode.
   - The skipped channel will not appear on the channel display during up/down scanning with the TV PROG. buttons.

Available channels in each band

Band indicator	Frequency	Channels
1	VHF band I (47 – 111 MHz)	E2 – E4 (Common European channels) S1 – S3, M1 (Belgium) X, Y, Z, S1 (Switzerland) R1 – R5 (Czechoslovakia, Hungary, Poland, U.S.S.R.)
3	VHF band III (111 – 300 MHz)	M2 – M10 (Belgium) S2 – S10 (West Germany, Switzerland) E5 – E12 (Common European channels) U1 – U10 (Belgium) S11 – S20 (West Germany, Switzerland) R6 – R12 (Czechoslovakia, Hungary, Poland, U.S.S.R.)
U	UHF band (470 – 862 MHz)	E21 – E69 (Common European channels) R21 – R69 (Czechoslovakia, Hungary, Poland, U.S.S.R.)

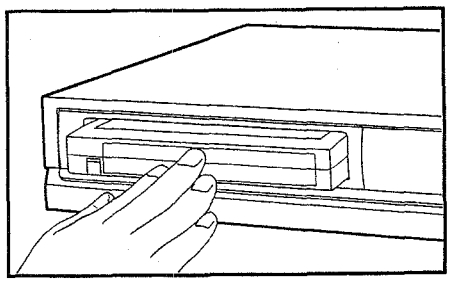
LOADING AND UNLOADING A CASSETTE

Motorized Loading System
- The cassette can be loaded even when the power has not been turned on. Inserting a cassette into the loading slot turns the power on automatically.
- The cassette can be unloaded even when the power has been turned off. If a cassette is inside, pressing the EJECT button turns the power on automatically and, after ejection of the cassette, shuts it off automatically.

Auto-Play System
- Inserting a cassette, with its safety tab removed, turns the recorder on and playback of the cassette begins automatically.

LOADING

Insert a cassette as illustrated with its labelled side facing you.
- With a cassette inserted, the"📼" indicator appears on the FDP.
- The counter resets automatically when a cassette is inserted.



Notes:
- Be sure to insert the cassette firmly into the slot; otherwise it will be automatically ejected.
- The automatic loading mechanism will operate only when the cassette is inserted correctly.

UNLOADING

Press the STOP/EJECT button ❼ in the Stop mode.

Caution
- If unloading of a cassette is not possible, check to see whether the TIMER indicator is lit. If so, press the TIMER button so the TIMER indicator extinguishes.
- Do not attempt to pull out the cassette once automatic loading has started.

WARNING
- Do not insert fingers or any foreign object beyond the door flap of the cassette loading slot, as this could lead to injury or damage to the mechanism. Show special caution with children.

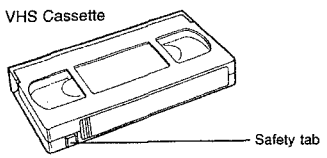
USABLE CASSETTES AND THEIR RECORDING TIME

Both regular VHS and S-VHS cassettes can be used with this video recorder for recording. However, only regular VHS recordings can be made and played back on this video recorder. S-VHS recordings can neither be made nor played back on this video recorder.

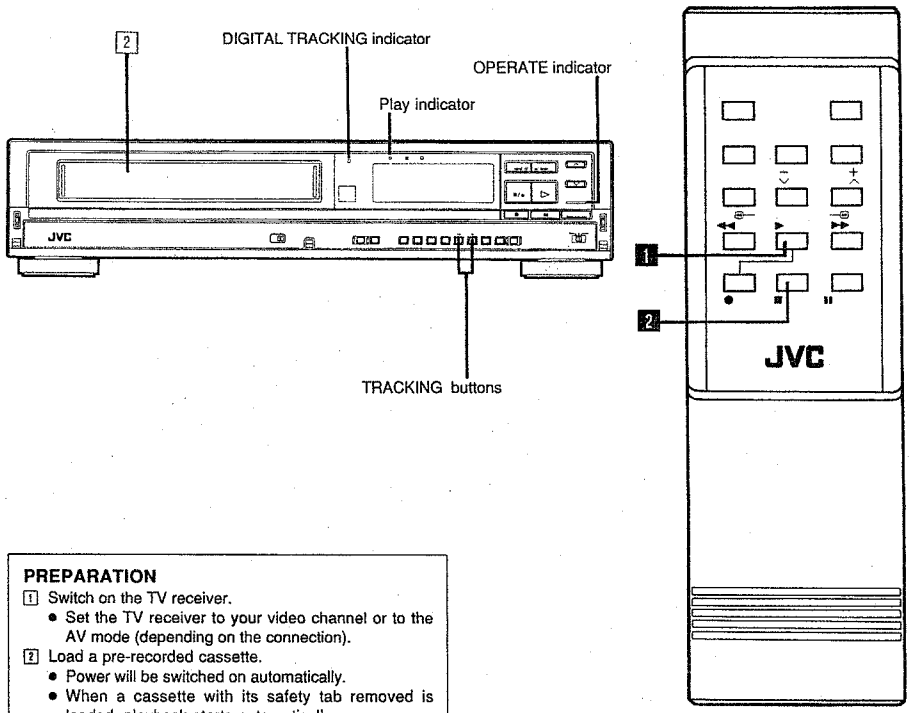
Type of Cassette	Recording/Playback Time
E-30	30 minutes
E-60	1 hour
E-90	1 hour, 30 minutes
E-120	2 hours
E-180	3 hours
E-240	4 hours

ACCIDENTAL ERASURE PREVENTION

- Video cassettes are equipped with a safety tab to prevent accidental erasure. When the tab is removed, recording cannot be performed. If you wish to record on a cassette whose tab has already been removed, use adhesive tape to block the hole.



PLAYING BACK A VIDEO CASSETTE



PREPARATION

1 Switch on the TV receiver.
- Set the TV receiver to your video channel or to the AV mode (depending on the connection).

2 Load a pre-recorded cassette.
- Power will be switched on automatically.
- When a cassette with its safety tab removed is loaded, playback starts automatically.

DIGITAL TRACKING SYSTEM

This recorder incorporates a digital tracking system for automatic tracking adjustment. In most cases you do not have to adjust the tracking.

- When you start playback after inserting a tape, the digital tracking system automatically adjusts the tape path relative to the heads to obtain the best possible pictures.
- This automatic tracking adjustment also takes place when the playback output level reduces below a certain level.
- The DIGITAL TRACKING indicator blinks while the system is searching for optimum tracking, and remains lit as long as the automatic tracking mode continues.

If automatic tracking fails, and some noise bars are visible on the screen, use the manual tracking mode.

- Press both TRACKING buttons simultaneously to cancel the automatic mode, then press either button to move noise bars out of the screen.
- To return to the automatic mode, press both buttons simultaneously.

OPERATING PROCEDURE

1 Press the ► button.
2 Press the ■ button at the end of the programme.

Notes:

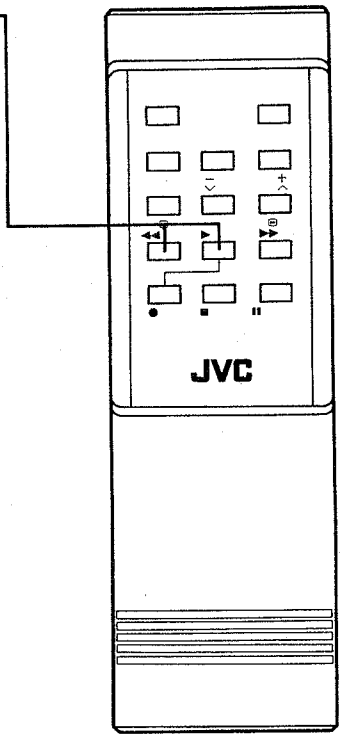
- For various convenience facilities and special-effects features available during playback, see the next two pages.
- The tape-end auto-rewind mechanism functions in the Play, Fast Forward and Forward Search modes.

CONVENIENT FACILITIES RELATED TO PLAYBACK

MEMORY PLAY

If you want to watch the tape from its beginning after rewinding, you do not have to wait for completion of rewind to press the ► button.

- Press the ◄◄ button and then ► button within 2 seconds. Playback will start automatically at the beginning of the tape. (Check to see that the counter memory indicator M is off).
  If you want to watch the tape from the counter reading of "0H 00M 00S", press the C. MEMORY button to obtain M. Then, press the ◄◄ (or ►►) button and then ►.
- While the tape is being rewound, the Play (▷) indicator is blinking. To cancel the Memory Play mode and go to another mode, press the corresponding button (■, ►, ►►, ◄◄).

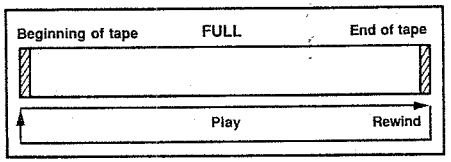


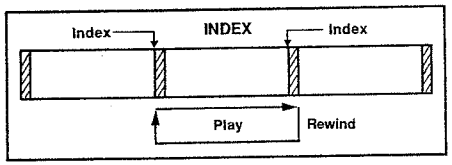
MEMORY POWER OFF

If you are going to turn the power off after rewinding the tape, press the OPERATE button within 2 seconds after pressing the ◄◄ button.

REPEAT PLAYBACK — FULL REPEAT OR INDEX REPEAT

This function allows you to set the video recorder for repeated playback (5 times) of the entire tape ("FULL REPEAT") or repeated playback (5 times) of a segment of the tape from one index mark to the next ("INDEX REPEAT"). An index mark is recorded automatically on the tape at the beginning of each recording.

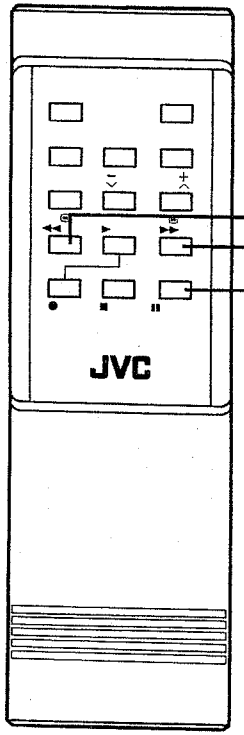




- Set the REPEAT switch ⑯ as required.
  With the switch in the INDEX REPEAT position, when the tape reaches the nearest index mark during playback, it rewinds to the previous index mark and playback is repeated between these two index marks.

Note:
After repeat playback, be sure to reset the REPEAT switch to "OFF".

SPECIAL-EFFECTS PLAYBACK



HIGH-SPEED REVERSE SEARCH
◄◄ button

- To rewind the tape, press this button in the Stop mode.
- To shuttle search the tape in the reverse direction, press this button in the Play mode.
- The shuttling speed is about 9 times normal.
- Press the ► button to return to normal playback.
- For briefer scanning, keep the ◄◄ button pressed for more than 2 seconds; when you release the button, the Search mode will be cancelled.

HIGH-SPEED FORWARD SEARCH
►► button

- To fast forward the tape, press this button in the Stop mode.
- To shuttle search the tape in the forward direction, press this button in the Play mode.
- The shuttling speed is about 9 times normal.
- Press the ► button to return to normal playback.
- For briefer scanning, keep the button pressed for more than 2 seconds; when you release the ►► button, the Search mode will be cancelled.

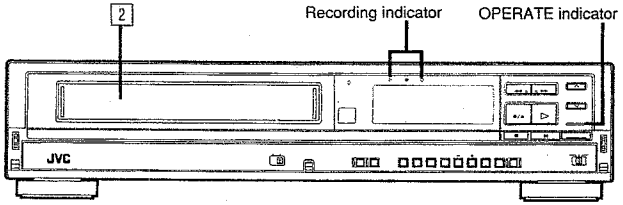
STILL PLAYBACK, FRAME ADVANCE AND SLOW MOTION
II button

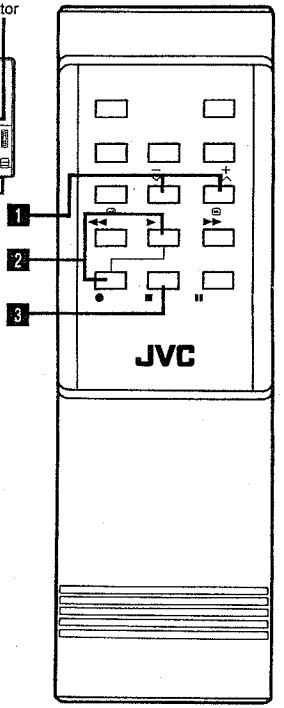
- To view a still picture, press this button in the Play mode.
- To advance the picture frame by frame, press this button again.
- To obtain slow-motion playback, keep this button pressed for more than 2 seconds.
- To return to the Still mode, press this button again.
- To return to normal playback, press the ► button.
- When the Still mode continues for longer than about 5 minutes, the Stop mode will be entered automatically.

Notes:

- With some televisions, the still picture may be unstable. If vertical vibration of the picture is observed, attempt to correct it by pressing the V.LOCK buttons.
- If noise bars are visible in the Still, Slow, or Frame-by-Frame mode, attempt to correct it in the manual tracking mode as described on page 10.
- No audio is available during any special-effects playback mode.

RECORDING TV PROGRAMMES





PREPARATION

1 Switch on the TV receiver.
- Set the TV receiver to your video channel , or to the AV mode (depending on the connection).

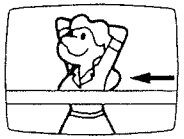
2 Load a cassette (with safety tab in place). Power will be switched on automatically.

OPERATING PROCEDURE

1 Select the channel you wish to record with the TV PROG. ∨/∧ buttons.

2 Press the ● and ► buttons simultaneously to start recording. "INDX" will appear on the FDP and blink to show that an index code is being recorded.
(When using the video recorder's front panel control buttons, press REC/ITR once to start recording.)
- If there is part of the programme you do not want to record, press the II button. A white horizontal bar will appear on the screen, which reduces in size in 4 steps as time elapses. When the last quarter starts blinking and disappears, the Stop mode will be entered automatically. The pause duration is possible for about 5 minutes:
- To continue recording from the Pause mode, press the ► button while the white bar is on-screen.

PAUSE MODE INDICATOR



3 Press the ■ button at the end of the programme.

RECORDING ONE TV PROGRAMME WHILE WATCHING ANOTHER

A programme not being viewed can be recorded while you enjoy viewing another programme.
This permits the recorded programme to be played back later at your convenience.

The key points to remember are:
- Select the channel you wish to record with the recorder's channel selector.
- Select the channel you wish to view with the TV receiver's channel selector.

Notes:

- If the REC/ITR button is pressed more than once, the Instant Timer Recording mode will be entered (see page 15). To return to ordinary recording, repeatedly press the REC/ITR button until the ITR indicator on the FDP extinguishes.
- When recording is restarted from the Record-Pause mode, assemble recording is performed so that the playback picture will not distort at the edit point. A few frames recorded before the pause may be erased due to overlap of the new recording. This is not due to any defect of the unit.
- If the ● button cannot be engaged, check to see if the cassette safety tab has been removed. (See page 9).
- When the end of the tape is reached during recording, the tape is automatically rewound to the beginning and stops.
- The built-in tuner's automatic channel lock mechanism prevents the selected channel from being altered during recording. Therefore, if you wish to change the channel during recording, first engage the Record-Pause mode and then select a different channel.

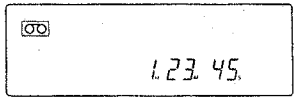
CONVENIENT FACILITIES RELATED TO RECORDING

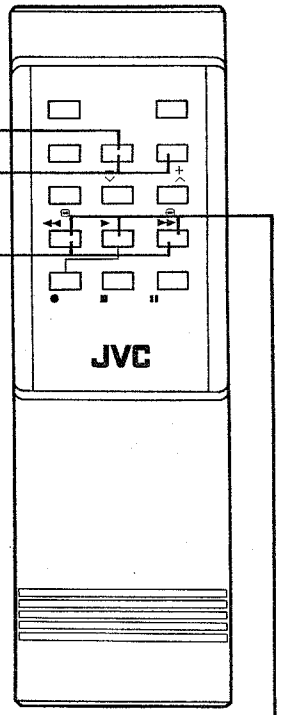
REALTIME TAPE COUNTER

Unlike usual tape counters which show tape locations in numbers, this realtime tape counter shows tape time precisely in hours, minutes and seconds in all modes. The counter resets automatically when a cassette is inserted.

ELAPSED RECORDING TIME INDICATION

When you need to know the exact time of a recording, press the C. RESET button before starting recording or playback. The counter will be reset to "0H 00M 00S" and show the exact elapsed time as the tape runs.





COUNTER MEMORY FUNCTION

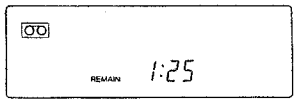
1. Press the C. RESET button at a point which you may wish to locate later.
   - The counter will read "0H 00M 00S".
2. Press the C. MEMORY button. M will appear on the FDP.
3. Press the ◄◄ (or ►►) button when you need to return to the designated point.
   - The tape will rewind (or fast forward) and stop at about "0H 00M 00S" automatically.
   - The Counter Memory function can also be used in conjunction with the Memory Play function (page 11).

REMAINING TAPE TIME INDICATION

The tape counter can be switched to display the remaining tape time.

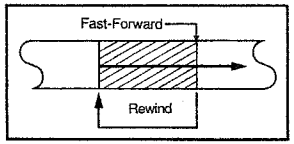
- Press the DISPLAY button ⓱ to obtain the REMAIN tape time indication in hours and minutes on the FDP.

Note:
- The indicated remaining time is approximate.



RETAKE FUNCTION

While in the Record-Pause mode, pressing the ►► or ◄◄ button initiates normal-speed search in the corresponding direction. Releasing the button engages the Record-Pause mode. If you have recorded unnecessary material because of having engaged the Record-Pause mode too late, use this function to return to the position where you want the next recording to start. Then, simply press the ► button when you want to re-start recording.



Note:
- Rainbow noise may occur in the rewound and re-recorded section.

INSTANT TIMER RECORDING

24-HOUR TIMER

The 24-Hour Timer Recording feature allows unattended automatic starting and stopping of the recording of a single programme which starts within a 24-hour period.

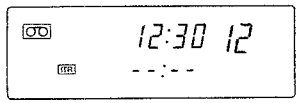
Preparation

1. Insert a cassette with its safety tab in place. The recorder turns on automatically.
2. Select the channel you wish to record from.

Setting the timer

1. Press the START button ㉑ to engage the 24-Hour Instant Timer Set mode. The following appears on the FDP with the current time.

FDP



   - Each pressing delays the START time by 30 minutes
   - For a more precise time setting, use the SELECT and SET buttons.
2. After reaching the desired START time, press the REC/ITR button the required number of times to set the desired length of recording time.
   - For a more precise time setting, use the SELECT and SET buttons.
3. After confirming the START time and recording length, press the OPERATE button.
   - "ITR" remains on the FDP and the 24-Hour Instant Timer Standby mode will automatically engaged.
   - If the programme has not been correctly preset, the "ITR" indicator will blink for about 10 seconds when the OPERATE button is pressed. Recheck the programmed data.

Notes:
- At each step of the timer setting procedure, if no data is entered within 10 seconds, the 24-Hour Timer Set mode is cancelled, and the current time is displayed.
- To cancel the 24-Hour Timer Set mode, press the CANCEL button once or twice depending on the setting status.
- 24-Hour Timer Recording has priority over other timer programme settings; therefore, no other programmes, set for timer recording, will be recorded until 24-Hour Timer Recording has been executed.

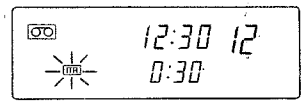
OFF-TIMER

- Start recording as described on page 13.

After you start recording, the recorder can be set to stop automatically after a certain period of time. Use this facility for starting a recording before you go to bed or leave home.

1. Press the REC/ITR button while recording (or twice if in the Stop mode).
   - The following indication will appear on the FDP, to show that the recorder is recording in the Instant Timer Recording mode and power will switch off after 30 minutes.

FDP



2. Each time the REC/ITR button is pressed, recording time increases by 30 minutes to a maximum of 4 hours. If the REC/ITR button is pressed again, the Normal Recording mode will be entered.
   - For a more precise time setting, use the SELECT and SET buttons to set to the exact time required (possible up to 4 hours and 59 minutes).

Notes:
- While recording is in progress, the displayed time counts down; when 0:00 is reached, the Record mode is released after 10 seconds and the power is switched off.
- If you want to stop recording after having started recording in the Instant Timer Record mode, press the STOP/EJECT button.
- If instant timer recording is engaged while the unit is in the Pause mode, the timer will count down normally, but recording will not begin until the PLAY button is pressed.
- When the Instant Timer Record-Pause mode continues for longer than 5 minutes, the mode is released and power is switched off.
- If you want to check the elapsed time (Realtime Counter reading) on the FDP while performing Instant Timer Recording, press the DISPLAY button to obtain the desired indication. After about 5 seconds, the indicator will return to the ITR mode and the remaining time indication will reappear automatically.

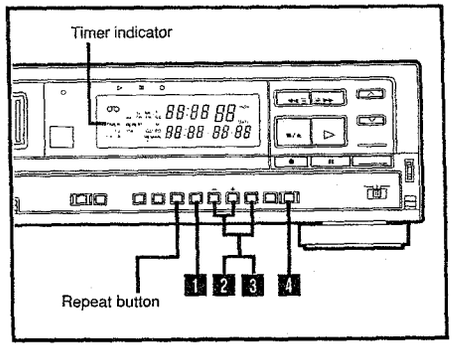
AUTOMATIC TIMER RECORDING

First of all, load a cassette (with safety tab in place); power will be switched on automatically.

Two ways to perform timer programming

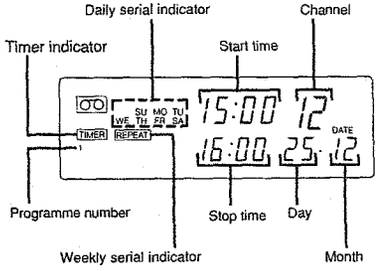
A. **Local programming:** Programme the timer using the recorder's controls while referring to the recorder's FDP.

B. **Direct remote programming:** Programme the timer using the remote control's buttons while referring to the recorder's FDP.



A. Local Programming

1. Press PROGRAM button ㉓.
   - The display will change to the Timer Set mode for programme number "1". To advance to programme number 2 – 8, press either SET button ㉒ a required number of times.
2. Set the start time by using the SELECT button ㉔ and the SET buttons alternately.
   - Select the item to be set with the SELECT button; the selected item will blink.
   - Set the desired data with the SET –/+ buttons.
   - To record a weekly serial, press the REPEAT button ㉑ once.
   - To record a daily serial starting on a certain day, press REPEAT twice.
3. Set the stop time, date and channel in succession in the same way as for setting the start time.
   - To record a daily serial starting on the day of setting, there is no need to enter any date figure; simply advance to the next item.
   - For programming the timer to record an external source, while the channel position is blinking, press SET –/+ until the "AU" indicator appears in the channel display section on the FDP.

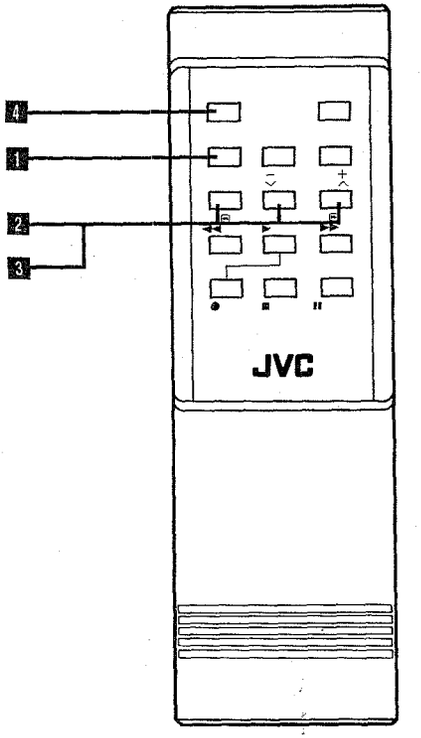


4. After making sure that the cassette is loaded, press the TIMER button ㉕.
   - The Timer Recording Standby mode will be engaged with the TIMER indicator and the preset programme number(s) illuminated and the power turned off.
   - With no cassette loaded, the TIMER and "cassette loaded" indicators will continue blinking.
   - A cassette whose safety tab has been removed will be ejected automatically.
   - If a preset programme contains errors, the programme number will not illuminate. Recheck the programmed data.

CONTINUED ON NEXT PAGE ....

B. Direct Remote Programming

Following the procedures on the previous page, use the remote control's buttons instead of the recorder's with the remote control directed toward the recorder's infrared beam receiving window ㉖.



Setting the date, start and stop times, and channel

- It is not possible to set the date, start and stop times unless the date and clock have previously been set.
- Enter the data while the digits are blinking.
- The stop time can be set within 24 hours of the start time.
- Non-applicable numbers (such as January 32, February 30 for dates, 24 or larger for hours, 60 or larger for minutes and 49 or larger for channels) will be rejected when keyed in.

Cancelling the preset data

- The preset programmes can be cancelled. First disengage the Timer Standby mode and engage the Timer Set mode for the programme number you wish to cancel and then press the CANCEL button ⑮ or ④.
- An executed programme is automatically cleared.

Timer recording operation

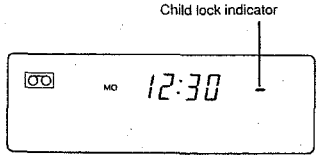
- When the preset start time is reached, recording starts.
- After timer recording, the power is switched off. If the end of the tape is reached during timer recording, the cassette is automatically ejected and then the power is switched off.

CHILD LOCK FUNCTION

The Child Lock function is for preventing accidental operation by young children, or other unwanted operation, such as playing back or recording over an important cassette you may have left inserted in the recorder. By engaging the Child Lock mode, the operation buttons on the recorder become ineffective, unless the remote control is used.

To engage the Child Lock mode

- Press the remote control's OPERATE button ② to turn the recorder power off and keep this button pressed for about 2 seconds after the power LED indicator has gone off.
- The Child Lock indicator (–) will appear in the channel display section on the FDP to show that the recorder is now in the Child Lock mode.



To disengage the Child Lock mode

- When the remote control's OPERATE button is pressed to turn the recorder power on, this disengages the Child Lock mode. The recorder will turn on and the corresponding display will appear with the channel number appearing where the child lock indicator appeared before.
- Pressing the TIMER button during timer recording also disengages the Child Lock mode.

Notes:

- While in the Child Lock mode, the recorder can receive timer programmed data from the remote control.
- Timer recording is possible also, even while in the Child Lock mode. After timer recording has been performed, the Child Lock mode remains in effect.
- Even after automatic cassette ejection at tape end, following timer recording, the Child Lock mode remains in effect.
- It is possible to insert a cassette while in the Child Lock mode. After inserting a cassette, the Child Lock mode remains in effect.

RECORDING FROM AN EXTERNAL SOURCE

By connecting an external video source (such as a 2nd video recorder, VideoMovie camera-recorder, etc.) to the VIDEO IN and AUDIO IN connectors, tape-to-tape transfer is possible.

- For connection of these units, an appropriate cable is necessary.

Connection

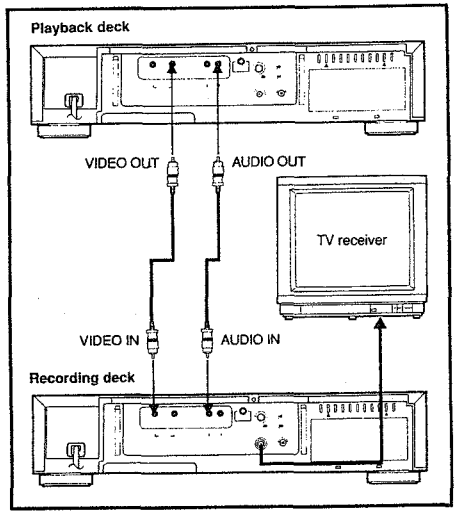
1. Connect the VIDEO IN ㉘ and AUDIO IN ㉙ connectors to the appropriate VIDEO and AUDIO output of the 2nd video recorder.
2. Connect a TV receiver to the recorder to monitor the picture while recording.

Operation

1. Turn the power on for all connected equipment.
2. Tune the TV receiver to your video channel.
3. Load a cassette with its safety tab in place.
4. Press either TV PROG. button ⑩ to obtain "AU" in the channel display section on the FDP.
5. Press the REC/ITR button ⑥ and the PAUSE/STILL/SLOW button ⑫ to put the recorder in the Record-Pause mode.
6. Play back a tape on the source equipment to determine the segment to be recorded.
7. Press the PLAY button ❾ to start recording.
8. To stop recording temporarily, press the PAUSE/STILL/SLOW button.
9. To end recording, press the STOP/EJECT button ❼.

Note:

- For the operation of the source equipment, refer to the instruction manual of the relevant machine.



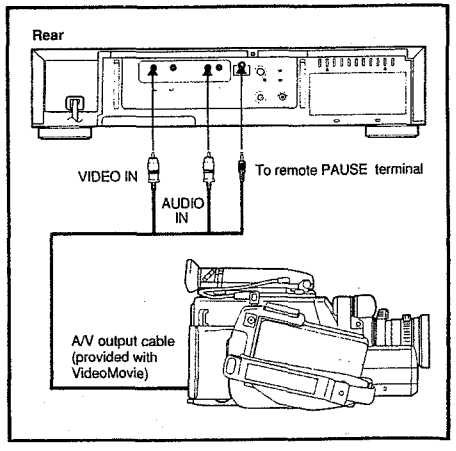
EDITING TO ANOTHER VIDEO RECORDER

This video recorder can also be used as the source player when editing tapes. This video recorder's remote PAUSE terminal is designed to accept a preroll command when used as a source player with a video deck which is preroll-capable and equipped with a Pause Control Output terminal. This combination makes possible synchronized preroll editing for high-quality editing results.

EDITING FROM A VIDEOMOVIE

- Connect the VideoMovie's AV OUT connector to the video recorder's VIDEO IN and AUDIO IN connectors.
- Connect the mini-plug of the AV output cable to the remote PAUSE terminal of the video recorder.
- When the recorder is connected to a VideoMovie which incorporates a Master Edit Control system*, you can control the recorder with the VideoMovie's controls for making edits free of transition-point gaps and distortion. Refer to the VideoMovie's instruction manual for detailed operating procedures for editing.
- With this connection, you can also use the VideoMovie as a video camera for direct recording onto the recorder's tape. Put the recorder in the Record-Pause mode and operate the VideoMovie's start/stop trigger to start and pause recording. (For direct recording with a separate video camera, a camera adapter is necessary.)

*JVC dedicated models only.



IN CASE OF DIFFICULTY

What may initially appear to be trouble is not always a real problem. Make sure first ...

POWER AND TAPE TRANSPORT PROBLEMS

Symptoms	Check points
No power is applied to the recorder.	• Is the power cord disconnected? — Connect it.
Clock is functioning properly, but the recorder cannot be powered.	• Is the TIMER indicator lit on the FDP? — Press TIMER to disengage the Timer Recording Standby mode.
Tape does not run during recording.	• Is the PAUSE/STILL/SLOW button engaged? — Press the PLAY button.
Tape stops in the Rewind or Fast-Forward mode.	• Is the COUNTER MEMORY switch set so that "M" appears on the FDP? — Press to make "M" disappear.
Tape will not rewind or fast forward.	• Is the tape already fully rewound or fast forwarded? — Check the cassette.

RECORDING PROBLEMS

Symptoms	Check points
Recording cannot be started.	• Is a cassette loaded? • Is the safety tab on the cassette removed? — Reseal the slot with cellophane tape.
Camera recording is not possible.	• Are the camera and the camera adapter correctly connected? • Is the power switch of the camera adapter set to ON? • Does the channel display indicate "AU"? — Press TV PROG. until "AU" appears in the channel display.
Timer recording is not possible.	• Have you set the clock correctly and programmed the timer correctly? — Check once again. • Is the TIMER indicator lit on the FDP? — Press TIMER.

PLAYBACK PROBLEMS

Symptoms	Check points
Playback picture does not appear while the tape is running	• Is the TV receiver's channel selector set to the correct video channel? — Set it to the RF converter channel. (See page 6.) • If you are using AV connection, is the television engaged in the AV mode? — Operate the television's mode.
Playback is repeated.	• Is the REPEAT switch set to either "FULL REPEAT" or "INDEX REPEAT"? — Set it to "OFF".
Noise appears during playback.	• Is the automatic tracking mode engaged? — Engage the manual tracking mode. (See page 10.)
Playback picture is blurred or interrupted while TV broadcasts are clear.	• Video heads may be dirty. — Head cleaning is necessary. Consult your JVC dealer.
Picture is normal but no sound.	• Is the SYSTEM select switch set to the appropriate position? — Set to G or K depending on the system of your television receiver.

OTHERS

Symptoms	Check points
Whistling or howling is heard from TV.	• Move camera or microphone away from TV or reduce TV sound volume.
Some channels are skipped over when selecting a channel.	• Those channels are preset to be skipped over. If you need them, restore them.
Channel cannot be switched.	• Is recording in progress? — Press PAUSE/STILL/SLOW, select a desired channel and press PLAY.
The recorder cannot be operated with the remote control.	• Batteries are discharged. — Replace with new one.

This recorder contains microcomputers. External electronic noise or interference could cause malfunctioning. In such cases, switch the power off and unplug the power cord. Then plug it in again and switch on. Take out the cassette. After checking the cassette, operate the unit as usual.

HEAD CLEANING

- Picture playback may become blurred or interrupted while the TV programme received is clear. This does not mean that the recorded programme has been erased.
- Dirt accumulated on the video heads after long periods of use causes such problems. In this case, head cleaning requiring highly technical care is necessary.

For head cleaning, consult the nearest JVC dealer.

SPECIFICATIONS

GENERAL

Power requirement	:	AC 110 — 240 V~, 50/60 Hz
Power consumption	:	21 W
Temperature	:	5°C to 40°C (Operating)
	:	–20°C to 60°C (Storage)
Operating position	:	Horizontal only
Dimensions (WxHxD)	:	435 x 94 x 322 mm
Weight	:	5.3 kg
Format	:	VHS PAL standard
Tape width	:	12.65 mm
Tape speed	:	23.39 mm/sec
Maximum recording time	:	240 min. with E-240 video cassette

VIDEO

Signal system	:	PAL colour and CCIR monochrome signals, 625 lines/50 fields (See "WARNING")
Recording system	:	Rotary, slant azimuth two-head helical scan system
Input	:	0.5 to 2.0 Vp-p, 75 ohms, unbalanced
Output	:	1.0 Vp-p, 75 ohms, unbalanced
Signal-to-noise ratio	:	43 dB (Rohde & Schwarz noise meter)
Horizontal resolution	:	250 lines

AUDIO

Recording system	:	Longitudinal track
Input	:	Line: –8 dBs, 50 k-ohms, unbalanced
Output level	:	–6 dBs, high impedance load
Output impedance	:	Less than 1 k-ohm, unbalanced
Frequency range	:	70 Hz to 10,000 Hz

TUNER

Tuning system	:	Voltage synthesized tuner
TV channel storage capacity	:	48 positions (+ AUX position "AU")
Channel coverage	:	VHF 47 — 111 MHz 111 — 300 MHz UHF 470 — 862 MHz
Aerial output	:	UHF channel 36 (adjustable 32 — 40)

TIMER

Clock reference	:	Quartz-crystal
Programme capacity	:	1-year/8-programme timer
Memory back-up time	:	60 min.

ACCESSORIES

Provided accessories	:	Aerial cable, Infrared remote control unit, "R6" battery x 2, Video cassette tape

Design and specifications subject to change without notice.

WARNING

1. In addition to PAL B/G and PAL D/K colour television signals, this recorder can also receive SECAM B/G and SECAM D/K colour television signals. SECAM B/G and SECAM D/K colour television signals can be recorded and played back in colour as far as this same recorder is used for recording and playback.
2. SECAM B/G and SECAM D/K colour television signals recorded on this recorder produce monochrome pictures if played back on another PAL or SECAM recorder.
3. SECAM B/G and SECAM D/K colour television signals recorded on another PAL or SECAM recorder produce monochrome pictures if played back on this recorder.
4. This recorder cannot be used in France. Use in France a recorder which is capable of receiving SECAM L colour television signals.
5. SECAM L prerecorded cassettes or recordings made with a SECAM L video recorder produce monochrome pictures when played back on this recorder.

SECTION 1
DISASSEMBLY AND MECHANISM ADJUSTMENTS

1.1 DISASSEMBLY

1.1.1 Top cover

1. Refer to Fig. 1-1-1 and set for the EJECT (Stop) mode and disconnect VCR from AC power.
2. Take out 4 screws (A) and 1 screw (B). To remove the top cover, slide it in the direction of the arrow and lift it away.

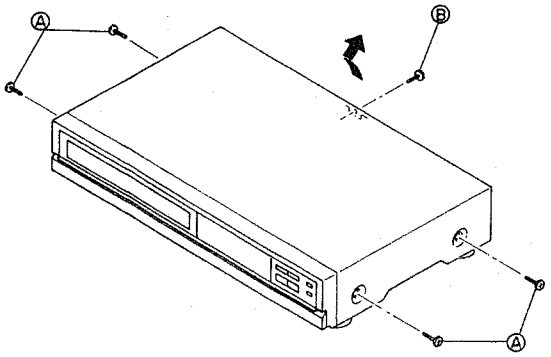


Fig. 1-1-1

1.1.2 Front panel assembly

1. Remove the top cover.
2. Carefully disengage 3 tabs (C) of the front panel assembly from the upper side of the chassis.
3. Refer to Fig. 1-1-2 and pull the front panel assembly forward you to disengage 3 tabs (D) of the front panel assembly from the bottom side of the chassis, then remove the front panel assembly.

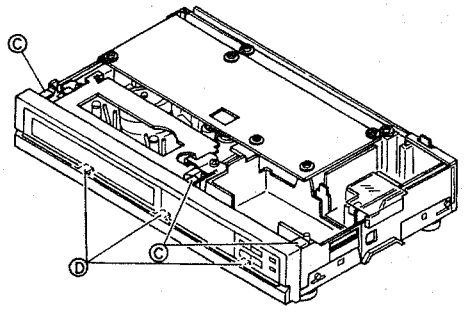


Fig. 1-1-2

1.1.3 Bottom cover

1. Remove the top cover.
2. Refer to Fig. 1-1-3 and take out 4 screws (E) and 2 screws (F) from the bottom of the chassis.
3. Disengage the bottom cover from 5 claws (G) on the bottom of the chassis.

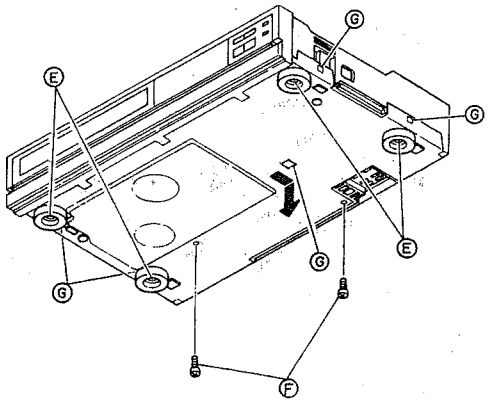


Fig. 1-1-3

1.1.4 Main board assembly

1. Remove the top cover.
2. Refer to Fig. 1-1-4 and take out 5 screws (H) and 1 screw (I) from main board assembly.

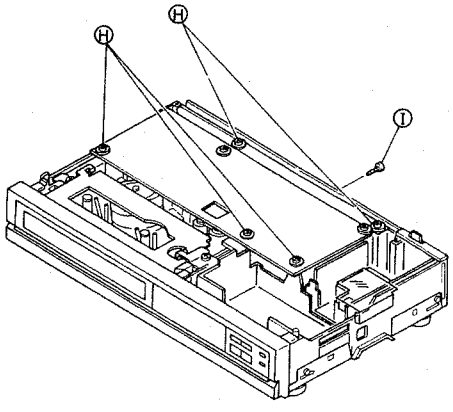


Fig. 1-1-4

1.1.5 Cassette housing

1. Remove the top cover and main board assembly.
2. Refer to Figs. 1-1-5 and 1-1-6.
   Take out 4 screws (J) that secure the cassette housing. Disengage 3 tabs (K) of the front panel and pull the front panel forward where it does not interfere with removing the cassette housing.
   Take out 2 screws (P) and remove the drum shield cover.
   Remove the cassette housing in the upward direction.

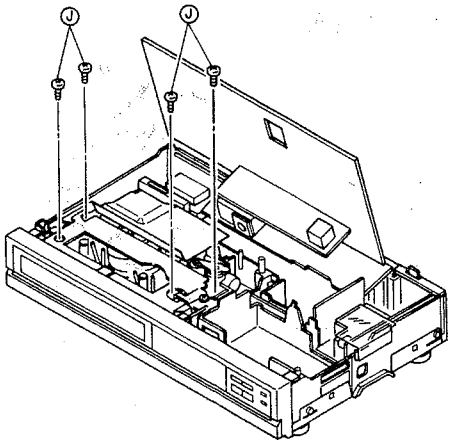


Fig. 1-1-5

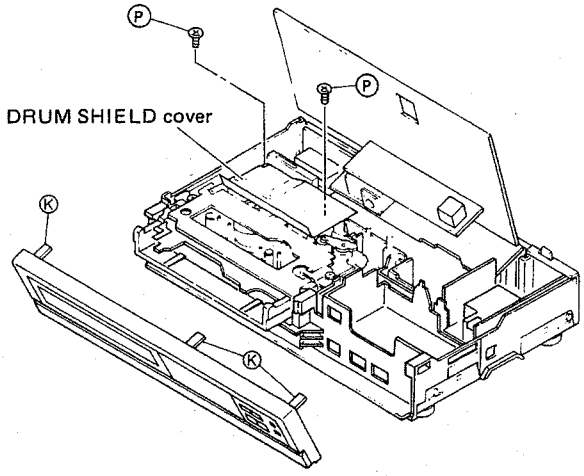


Fig. 1-1-6

1.1.6 Cassette housing installation

1. On the main deck, observe the positional relationships of the parts indicated in Fig. 1-1-7.
   If necessary, turn the loading motor by hand to obtain these positions.

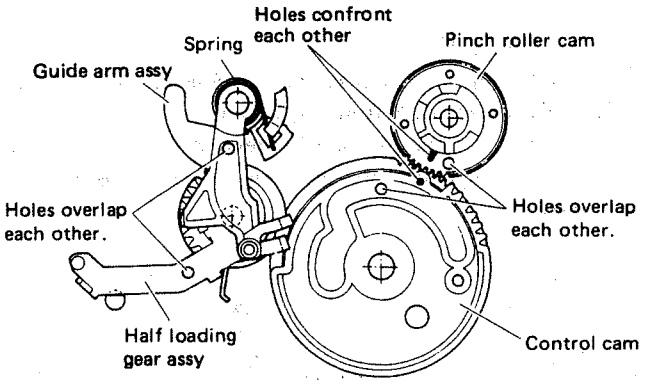


Fig. 1-1-7

2. Refer to Fig. 1-1-8 and confirm that the clutch is engaged.
   If necessary, press the lever indicated by the arrow to where the clutch is locked.

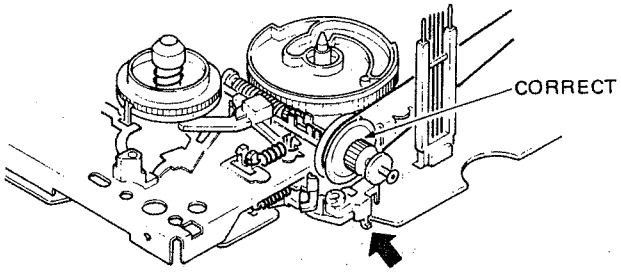


Fig. 1-1-8

3. Check that the cassette housing is in the eject state (internal holder of the cassette housing is locked in raised position).
   Set the cassette housing into place and secure with 4 screws.
4. Install the front panel as shown in Fig. 1-1-9 and re-engage the tabs. Supply power and use a spare cassette to check for normal loading and eject operations.

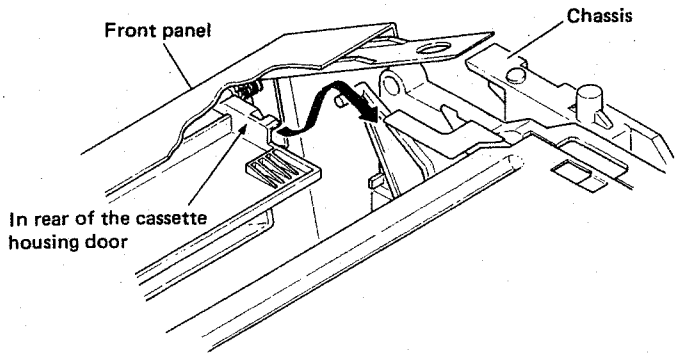


Fig. 1-1-9

5. Disconnect VCR from power, then reinstall the main board assembly and top cover.

1.1.7 Cassette housing door

1. Remove the top cover and front panel assembly.
2. Take out one screw (L) of the front panel assembly.
3. Refer to Fig. 1-1-10 and use care regarding the torsion spring, then pull out the left end of the cassette housing door to move it.

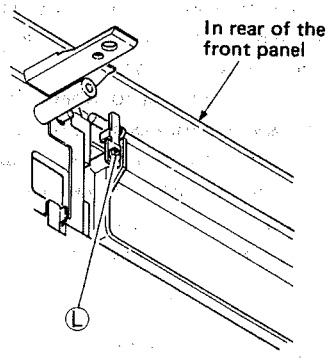


Fig. 1-1-10

1.1.8 Main-deck

1. Remove the top cover, front panel assembly and main board assembly.
2. Refer to Fig. 1-1-11 and take out 3 screws (M) from the main-deck assembly.
3. Remove the main-deck assembly in the upward direction and disconnect a connector of CN601 from the Main board, connectors of CN1, CN2 from the Pre/Rec board, connectors of CN1, CN2 from the A/C head board, a connector of CN1 from the Loading MDA board and a connector of CN1 from the Drum MDA board.

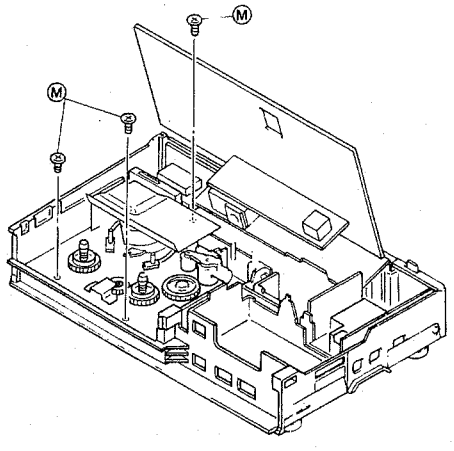


Fig. 1-1-11

1.2 MECHANISM ADJUSTMENTS

1.2.1 Precautions

1. Disconnect mainframe from AC power before soldering.
2. Avoid imparting stress to wires when disengaging connectors.
3. Determine and correct the cause of difficulty before proceeding to adjustments. Do not disturb settings unnecessarily.
4. Use care not to damage tabs, claws, etc. during repairs.
5. Install the cassette housing assembly only when the mechanism is in the Eject or Stop mode position. In the Eject mode, the internal holder of the housing is fully raised. This is fully lowered in the Stop mode.
6. When installing the front panel assembly, be sure to engage the housing door with the door lever of the cassette housing assembly. If this is omitted, the door will not open at Eject and the cassette cannot be removed.

1.2.2 Check without cassette housing

Mechanism operations can be observed easily by removing the cassette housing assembly. Note the following.

1. Disable the photo transistor sensor (END SENSOR) on the main-deck by applying an opaque cover.
2. Connect pins 2 and 3 of Main board connector CN601.
3. Select the desired modes with the operation buttons. However, notice that without tape, setting for the reverse direction modes produces the Stop mode after a few seconds due to absence of the reel sensor output.

1.2.3 Manually removing cassette tape

In event of electrical system failure that prevents the tape from being unloaded, the tape can be removed manually by the following procedure. Refer to Figs. 1-3-1, 1-3-2 and 1-3-3.

1. Disconnect power cord from AC outlet.
2. Turn the loading motor by hand so that the control cam rotates clockwise. This retracts the pole base assembly to the unloading position.
3. Continue turning to where the guide arm and half loading gear assemblies shift to beneath the cassette.
4. Turn the clutch assembly (capstan motot) at the rear of the deck to absorb slack tape within the cassette.
5. Again turn the loading motor in the same direction to raise the cassette and remove it.

1.2.4 Test equipment

The following special tools and fixtures are required for mechanism adjustment.

1. Alignment tape : MH-2
   Stairstep signal is employed for interchangeability checks and adjustments.
2. Torque gauge : PUJ48075-2
   Measures tape take-up torque.
3. Back tension cassette gauge : PUJ48076-2
   Measures tape tension at the supply side.
4. A/C head positioning tool : PUJ47351-2
   Shifts the head base for adjusting the control head position.
5. Roller driver : PTU94002
   Turns the guide roller for adjusting FM linearity.

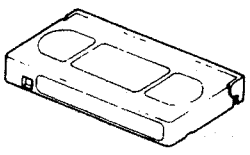
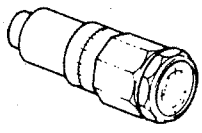
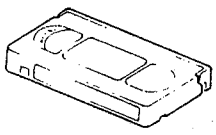
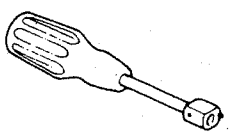
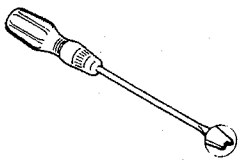
Alignment tapes 1	Torque gauge 2	Back tension cassette gauge 3	A/C head positioning tool 4	Roller driver 5
				

Fig. 1-2-4 Test equipment

1.3 MAIN MECHANISM PARTS

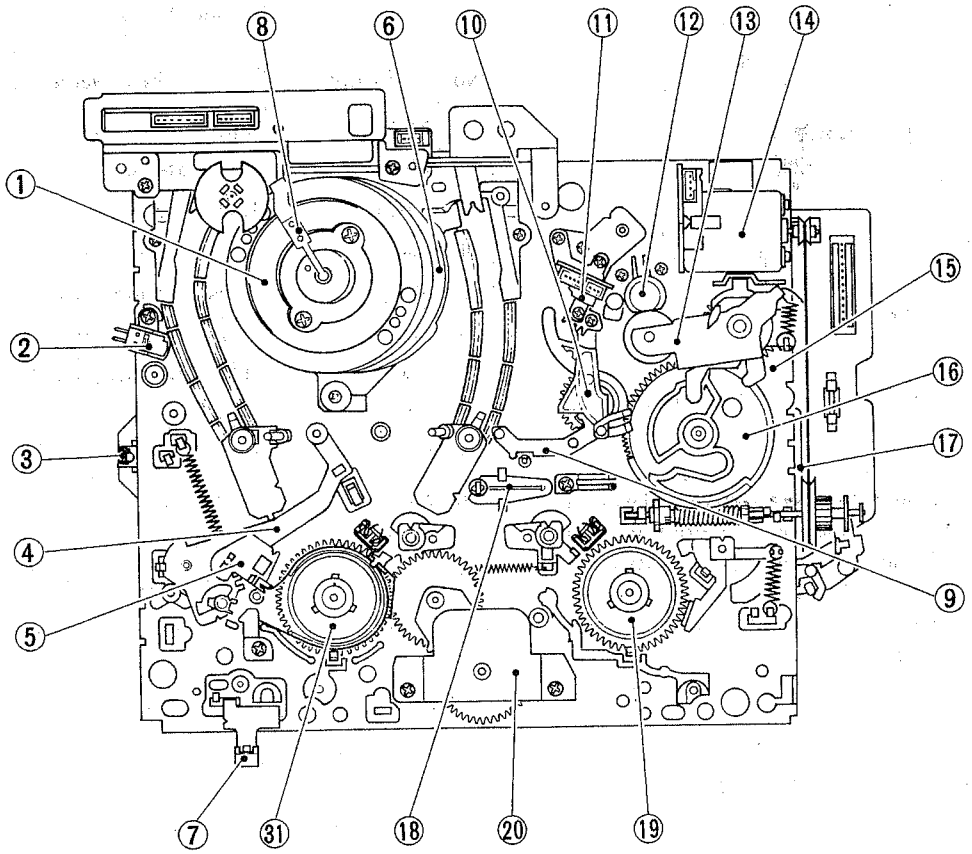


Fig. 1-3-1 Top view of main-deck

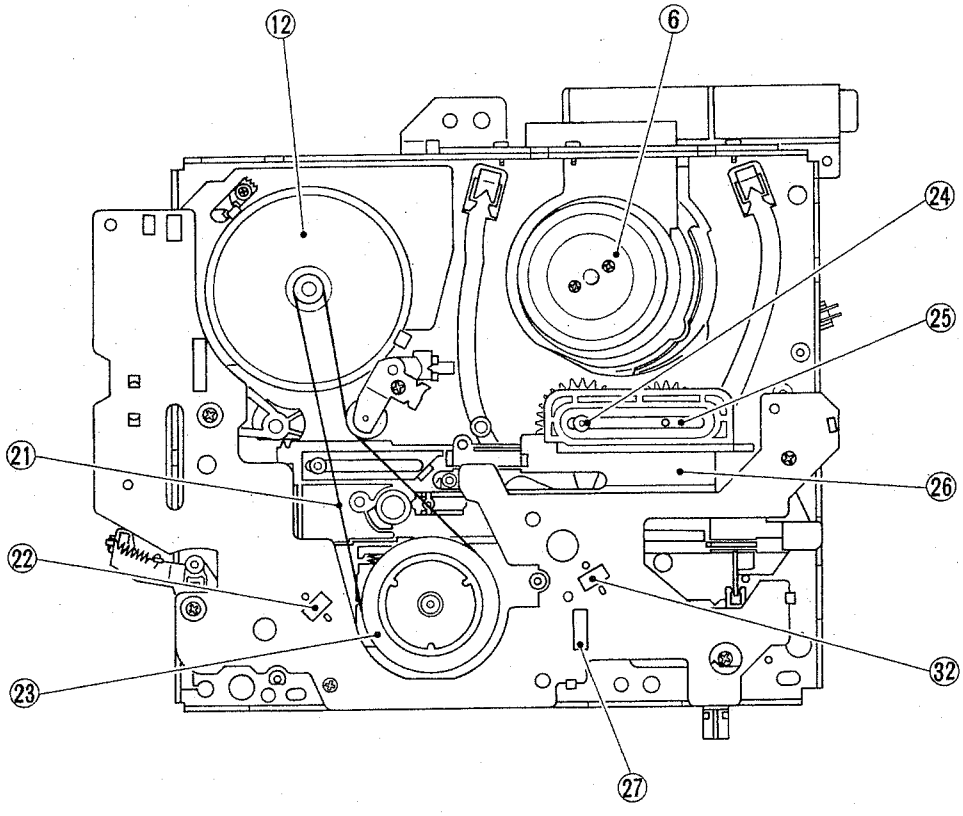


Fig. 1-3-2 Bottom view of main-deck

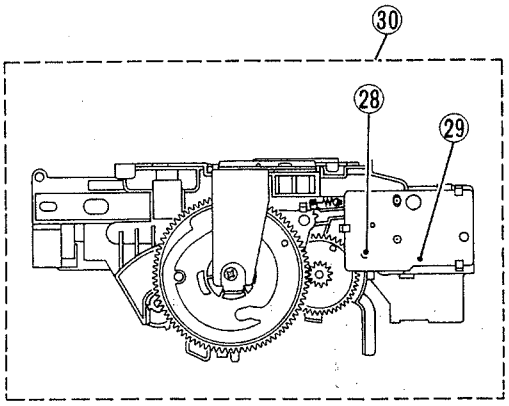


Fig. 1-3-3 Side view of cassette housing

A. Cleaning

Periodic cleaning of the tape transport system is desirable, but ordinarily not feasible in practice. Therefore, perform cleaning when a set is brought in for repairs or maintenance. Contamination of the video heads, tape guides and brushes can detract from playback picture quality and in extreme cases, even damage the tape. For cleaning, use a fine-mesh cotton cloth (about the texture of a white dress-shirt) moistened in alcohol.

- To clean the video heads, press the moistened cloth gently against the upper drum with fingertip and turn the drum by hand.
- Do not use a vertical stroke, as this may damage the heads.

B. Lubrication

Oil and grease do not normally require periodic replenshing. Apply only when replacing lubricated parts (also clean and replace lubrication of mating parts if soiled).

For parts and points to apply oil and grease, refer to the exploded views of the mechanism assembly.

Before oiling, clean with alcohol.
Apply one or two drops of oil. Avoid excess oil.

1. Table 1-1 indicates the oil and grease used in this set. Use these or recommended locally available equivalents.

Category	Part No.
Oil	COSMO-HV56
Grease	KANTO-G-31KAV

Table 1-1

2. Grease is not required for a replacement cassette housing assembly, as this has been applied at the factory.

Note: ***Stir grease that has been stored for an extended period.***

C. Main mechanical parts

See Figs. 1-3-1, 1-3-2 and 1-3-3.

No.	Symbol	Parts Name	See Section
1	M32A	Upper drum assy	
2	M44	Full erase head	
3	51Q1	End sensor	
4	M41	Tension arm assy	1.5.4
5	M42	Tension band assy	1.5.4
6	M32C	Lower drum motor assy	1.5.2
7	M461	REC safety switch (S2)	
8	M32D	Brush assy	
9	M449	Half loading gear assy	1.5.5
10	M447	Guide arm assy	1.5.5
11	M48	A/C head	1.5.3
12	M422	Capstan motor	
13	M442	Pinch roller arm assy	
14	M434	Loading motor assy	
15	M446	Pinch roller cam	1.5.5
16	M438	Control cam	1.5.5
17	M437	Loading belt	
18	M460	LED holder (D1)	
19	M430	Reel disk (take-up)	
20	M424	Idler gear unit	
21	M429	Timing belt	
22	51PS1	Take up reel sensor (PS1)	
23	M426	Clutch unit	1.5.6
24	M433	Take up loading arm assy	1.5.7
25	M432	Supply loading arm assy	1.5.7
26	M439	Plate assy	1.5.7
27	M462	Slide switch (S3)	
28	56PHS3	Cassette sensor (PHS3)	
29	56Q2	Start sensor (Q2)	
30	M36	Cassette housing assy	
31	M470	Reel disk (supply)	
32	51PS2	Supply reel sensor (PS2)	

- Symbol interpretation example

M32A: M = Exploded view symbol, 32 = Ref. No., A = Board No.

56 Q2: 56 = Ref. No., Q2 = Board No.

1.4 INSPECTION AND MAINTENANCE

This product employs rotary and moving parts which wear out in the course of usage. Periodic inspection, cleaning, lubrication and maintenance are therefore important for ensuring maximum performance. Worn parts must also be replaced at when required.

1.4.1 Suggested servicing schedule for main components

The following table indicates the suggested period for such service measures as cleaning, lubrication and replacement. In practice, the indicated periods will vary widely according to environmental and usage conditions. However, the indicated components should be inspected when a set is brought for service and the maintenance work performed if necessary.

Also note that rubber parts may deform in time, even if the set is not used.

System	No.	Parts Name	Symbol No.	Periodic servicing schedule (operation hours)								
				250	500	750	1000	1250	1500	1750	2000	Overhaul
Tape Transport	1	Upper drum	M32A	★	★	☆	○	○	○	○	○	●
	11	A/C head	M48	★	★	★	○	○	○	○	○	●
	13	Pinch roller	M442	★	★	★	○	○	○	○	○	●
	2	Full erase head	M44	★	★	★	○	○	○	○	○	●
	4	Tension arm	M41									●
	6	Lower drum	M32C				○	○	○	○	○	●
	12	Capstan (shaft)	M422	★	★	★	★	★	★	★	★	●
	9	Half loading gear	M449									●
	10	Guide arm	M447									●
Drive	12	Capstan motor	M422				○	○	○	○	○	●
	17	Loading Belt	M437				○	○	○	○	○	●
	21	Reel Belt	M424				○	○	○	○	○	●
	19	Take-up reel disk	M430				○	○	○	○	○	●
	31	Supply reel disk	M470				○	○	○	○	○	●
	23	Clutch assy	M426								○	●
	14	Loading motor	M434				○	○	○	○	○	●
		Worm clutch assy	M436								△	●
	26	Plate assy	M439								△	●
Others	5	Tension band	M42				○				○	●
	8	Brush	M32D				○				○	●

★ : Cleaning
☆ : Cleaning (or Replacement if necessary)
△ : Lubrication
No: Refer to Main mechanical parts

▲ : Lubrication (or Replacement if necessary)
● : Replacement
○ : Inspection or Replacement if necessary

Table 1-4-1 Approximate maintenance schedule

1.5 MAIN PARTS REMOVAL AND REPLACEMENT

No.	Item	Checkpoints	Adjustment and Checks
1	Upper drum assembly •Symptoms: FM signal absent, intermittent or weak on one channel; large difference in channel output levels •Cause: Worn or damaged video heads, poor response, etc.		
		Mounting direction See Fig. 1-5-1. (Symptom: no picture)	After replacing, observe that upper drum hole A is opposite the motor axis from lower drum hole B.
		Axis wobble See Fig. 1-5-2. (Symptom: jitter, poor FM linearity) PB FM: Main board TP206 DRUM FF: Main board TP411	Record and playback in SP mode. Confirm absence of large difference between channels. (Fig. 1-5-3)
		FM linearity check See Fig. 1-5-5. (Symptom: vertical sync absent, picture noise) PB FM: Main board TP206 FF: Main board TP411	1) Play stairstep signal of the MH-2 Alignment Tape. Confirm absence of obvious FM waveform loss and that operating the Tracking yields the optimum point. 2) Refer to Fig. 1-5-4, adjust for loss at the left edge (drum entry) of the FM waveform by turning the guide roller of the supply pole base. Similarly, adjust for loss at the right edge (drum exit) by turning the guide roller of the take-up pole base. **Note:** *If FM loss occurs on both channels and cannot be corrected by adjusting the guide rollers, the lower drum needs replacement.*

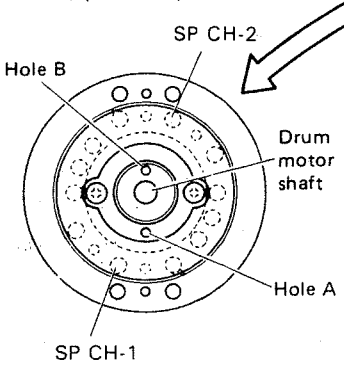


Fig. 1-5-1 DRUM TOP VIEW

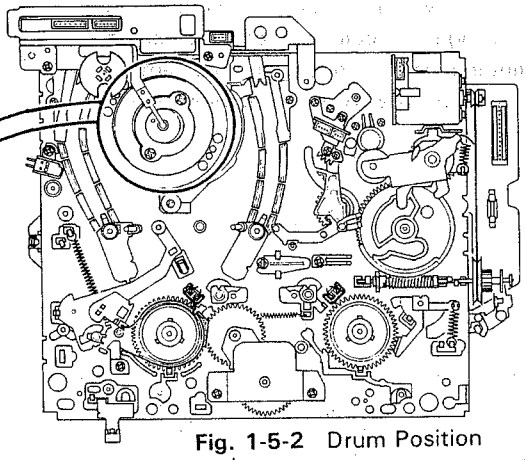


Fig. 1-5-2 Drum Position

Fig. 1-5-3 Axis wobble

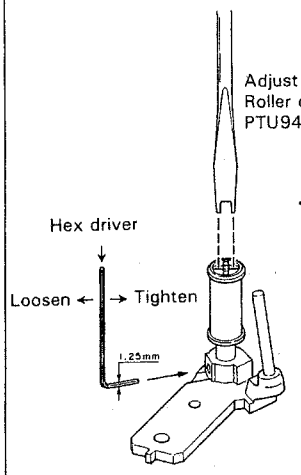


Fig. 1-5-4 S.T. Pole base

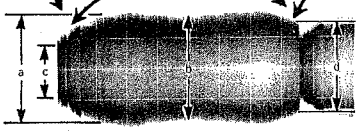


Fig. 1-5-5 FM linearity

$\frac{b}{a} \geqq 0.7$, $\frac{c}{a} \geqq 0.65$, $\frac{d}{a} \geqq 0.65$

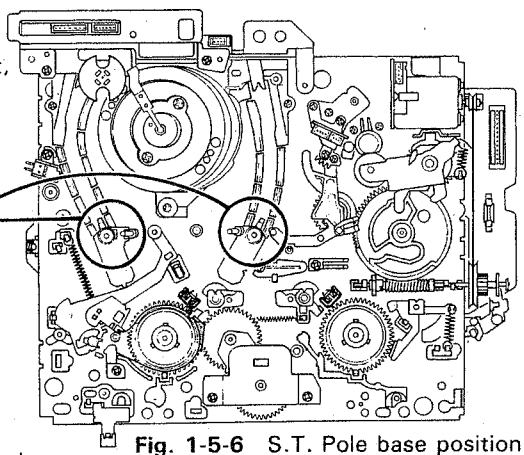
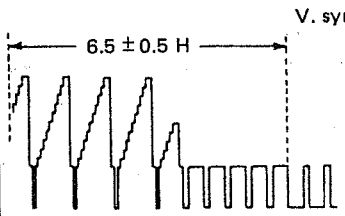
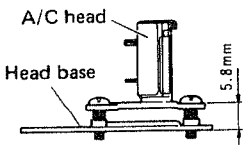
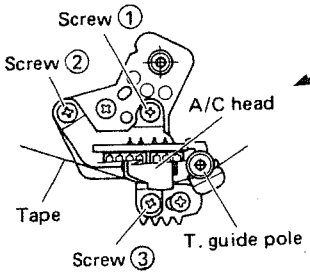
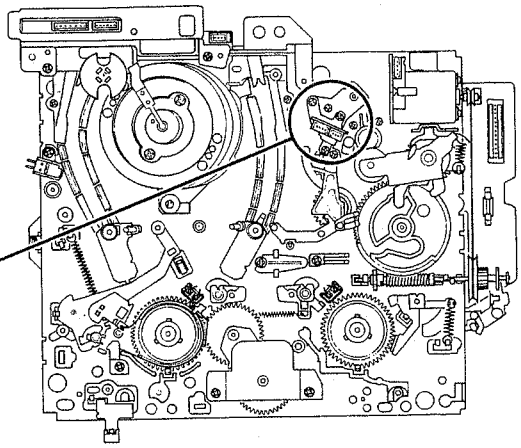
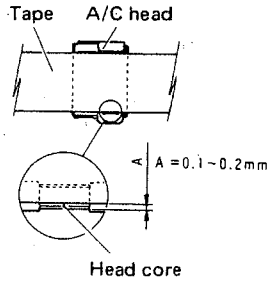
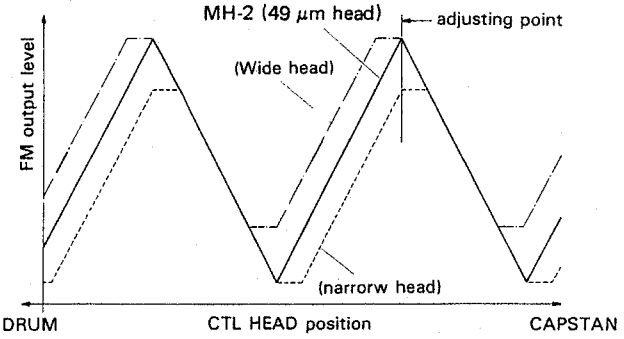
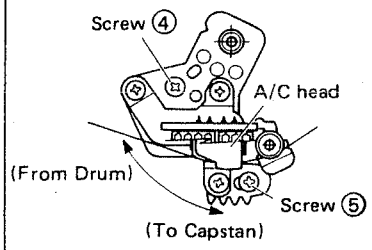
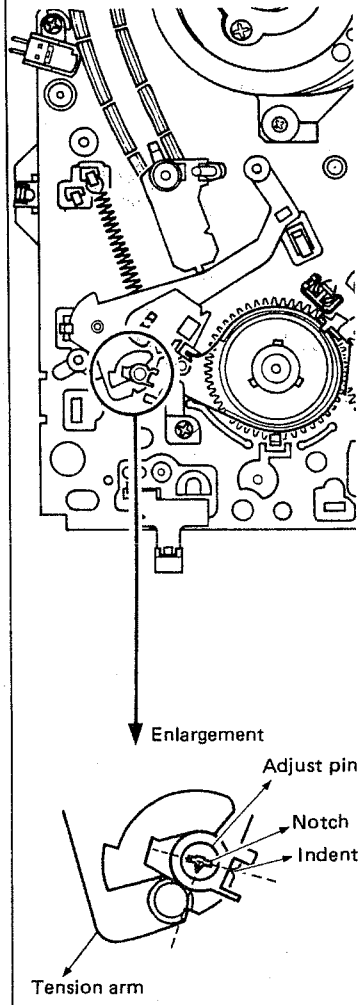
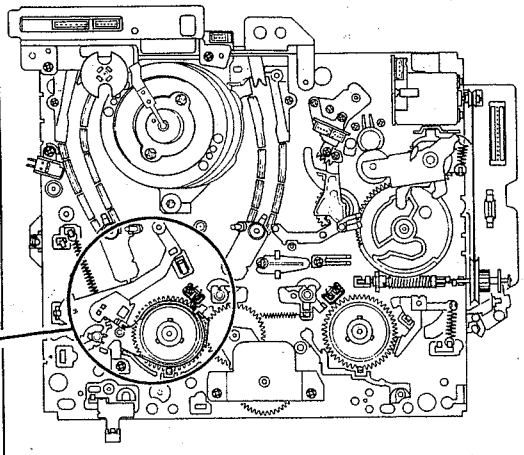
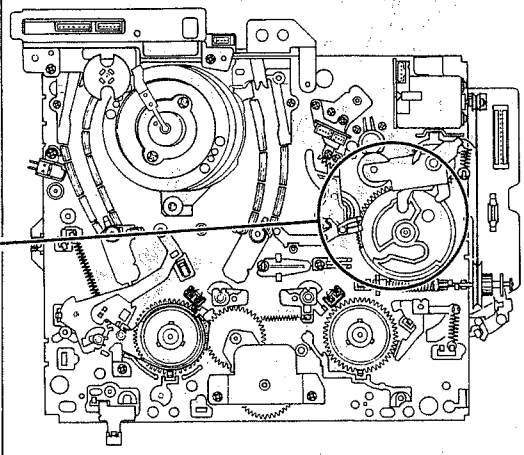
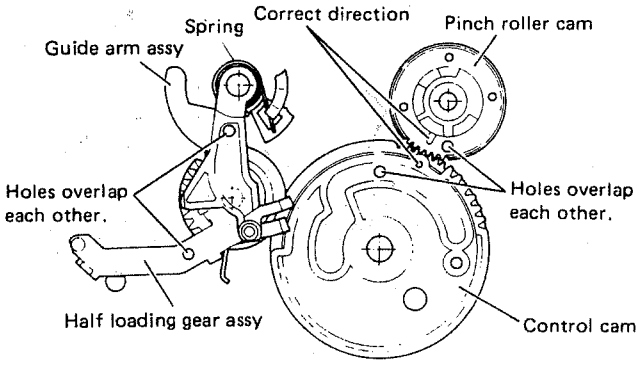


Fig. 1-5-6 S.T. Pole base position

No.	Item	Checkpoints	Adjustment and Checks
	PB switching point •Symptom: switching noise at picture bottom.	VIDEO OUT  **Fig. 1-5-7** PB Switching Point	1) Connect an oscilloscope to VIDEO OUT. 2) Set the MH-2 alignment tape into the cassette housing. Play back the stairstep segment of MH-2 alignment tape. 3) Trigger the oscilloscope externally (– slope) with the signal from TP411 (DRUM FF) of the main board. 4) Adjust R420 to position the trigger point 6.5 H ±0.5 H from V. sync as shown in Fig. 1-5-7.
2	Lower drum assembly •Symptoms: Poor FM linearity, noisy rotation, jitter •Cause: Lead and bearing wear	Check FM linearity and switching point.	See above upper drum assembly items.
		Check control head phase (X value) Symptom: tracking error PB FM: Main board TP206 DRUM FF: Main board TP411	1) Play stairstep signals of MH-2 Alignment Tape. Engage the Tracking Preset mode by pressing the + and – buttons simultaneously in the onscreen mode. Confirm that the same maximum FM waveform level is obtained as when the tracking is adjusted manually. 2) Refer to the A/C head adjustments.
3	A/C head  **Fig. 1-5-8** Temporary height  **Fig. 1-5-9** Inclination/Azimuth/ Height adj.	 **Fig. 1-5-10** A/C HEAD position	
		Temporarily set height as indicated in Fig. 1-5-8.	Set the height as indicated in Fig. 1-5-8 to facilitate tape transport checks and adjustments.
		Tilt (forward inclination) See Fig. 1-5-9. (Symptom: audio level varies greatly.)	1) Run tape, turn screw ① counterclockwise to where slight curling of the tape occurs at the lower flange of the take-up guide roller. 2) Then slowly turn the screw clockwise to where the curling ceases.
		Azimuth See Fig. 1-5-9. (Symptoms: audio low level or noisy) Audio output: Main board AUDIO OUT	1) Play stairstep signal (with audio 6 kHz) of the MH-2 Alignment Tape. Observe audio output signal with oscilloscope. 2) Turn screw ② and adjust for maximum audio output level.

No.	Item	Checkpoints	Adjustment and Checks
	 **Fig. 1-5-11** Height Adj	Height See Figs. 1-5-9 and 1-5-11. (Symptom: low audio and control signal levels)	1) Run tape and observe the control head area. 2) Turn screws ①, ② and ③ by small and equal amounts until 0.1 to 0.2 mm of the head core bottom can be seen. **Note:** *If difficult to observe, play stairstep signal of MH-2 Alignment Tape and adjust for maximum audio output and control pulse level.*
		FM linearity	Refer to upper drum assembly items. If adjustment is major, again check the azimuth.
	 **Fig. 1-5-13** CTL head phase	Control head phase See Fig. 1-5-12 PB FM: Main board TP206 DRUM FF: Main board TP411  **Fig. 1-5-12** CTL head phase	1) Play stairstep signal of MH-2 Alignment Tape and observe the FM waveform. Set for Tracking Preset by pressing the + and – buttons simultaneously in the onscreen mode. 2) Loosen screws ④ and ⑤. Set the A/C head positioning tool on screw ④, with the stud inserted into the nearby oblong hole. 3) Turn the tool first to position the A/C head fully toward the capstan. Then gradually return it toward the drum and stop at the position of maximum FM waveform output level as shown in Fig. 1-5-13. 4) Tighten screw ⑤ . Remove the tool and tighten screw ④.
	Note: *Trigger the oscilloscope externally signal from TP411 (DRUM FF). Use (+) trigger for MH-2 alignment tape.*		

No.	Item	Checkpoints	Adjustment and Checks
4	Tension arm assembly Tension band assembly  **Fig. 1-5-14** Tension arm assy	Tension pole position See Fig. 1-5-14. (Symptom: poor FM waveform response)	 **Fig. 1-5-15** Tension arm position 1) Check that the cassette housing is in the eject state (internal holder of the cassette housing is locked in raised position). 2) Turn the eccentric adjust pin to align the notch of the pin with the tension arm indent as shown in Fig. 1-5-14.
		Back tension (Symptom: skew)	1) When the tension pole position is correctly adjusted, the back tension will assume the correct value. 2) Use the Back Tension Cassette Gauge and set for the playback mode. Confirm reading of 35 to 48. 3) Changing the tension pole position in order to vary the back tension will cause adverse effects elsewhere.

No.	Item	Checkpoints	Adjustment and Checks
5	Pinch roller cam Control cam Half loading gear assembly Guide arm assembly		Set mechanism to Eject mode (internal holder of the cassette housing is locked in raised) position.
			
			Fig. 1-5-17 Control cam position
			
	Fig. 1-5-16 Control/Pinch roller cam		
		Important: Do not remove or disturb parts other than those mentioned. See Fig. 1-5-16.	1) When installing the pinch roller cam, overlap the largest hole of the gear portion with the hole of the deck. 2) Set the control cam on the deck with the hole of the groove overlapped with the hole of the deck. Observe that the small hole of the control cam and the ridge of the pinch roller cam are aligned. (If the control cam does not fit readily, shift the rear plate assembly within the range of play.) 3) Install the half loading gear assembly with the hole overlapped with the hole of the deck. Secure with E-ring. 4) Install the guide assembly over the spring and with the hole overlapping that of the deck. Engage the spring correctly.
		Cassette housing assembly	Install the cassette housing assembly with the mechanism in the Eject mode. Also observe that the inner holder of the housing is raised and locked.
6	Clutch assembly	Take-up torque (Symptom: inadequate take-up torque)	1) Remove cassette housing and set for play-back mode (see Section 1.2). 2) Set torque gauge on the take-up reel disk. Gradually relax your grip on the gauge and read the needle indication at the point the gauge begins to rotate with the disk. Confirm indication of 60 to 100.

No.	Item	Checkpoints	Adjustment and Checks
7	Take-up loading arm assembly Supply loading arm assembly Plate assembly		**Note:** • *Set mechanism to the Eject or Stop mode before removing these parts.* • *The flange of the plastic rivet securing the loading arm assembly and the pole base assembly can be damaged by attempting to remove it directly. Press the loading arm assembly firmly to prevent motion. Then use a narrow-shafted tool to press the rivet from the shaft end to remove it.*
		Mounting position alignment • Remove the tension arm assembly to facilitate operation. See Fig. 1-5-18.	1) Set the supply and take-up loading arm assemblies so that the holes of the gear portions are aligned, then secure to the pole base assemblies with rivets. 2) Shift the plate assembly and install with the holes of the upper and lower components overlapped.
		Slide switch See Fig. 1-5-18.	Be sure to engage the slide switch slider with the edge of the plate assembly.

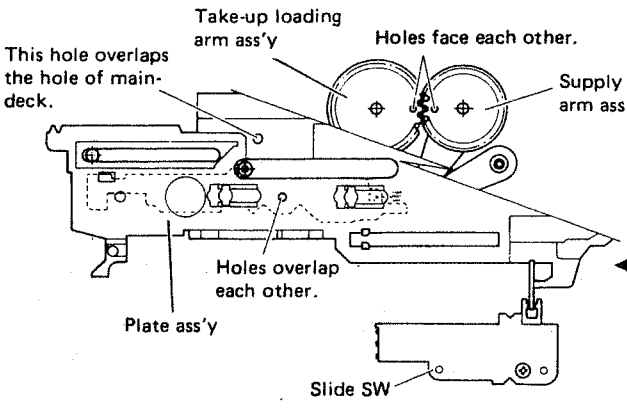


Fig. 1-5-18

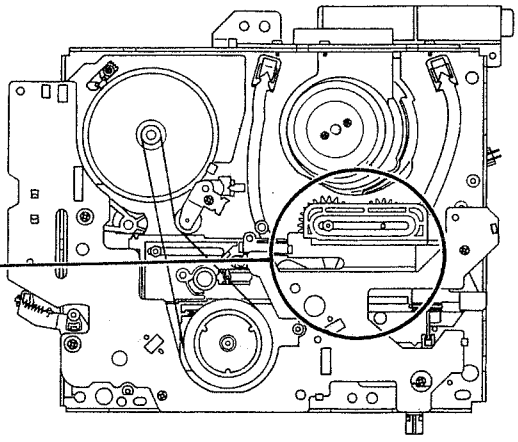


Fig. 1-5-19
T.S. Loading arm position

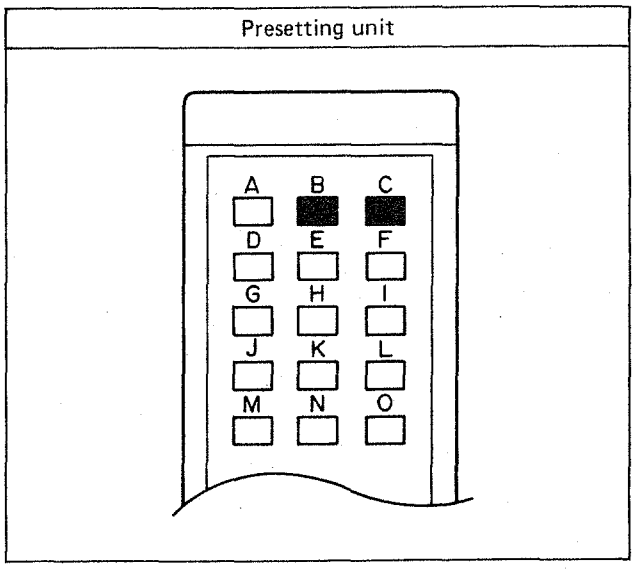
SECTION 2
ELECTRICAL ADJUSTMENTS

2.1 PREPARATION

Electrical adjustments are required after replacing circuit components and certain mechanical parts.
It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.

2.1.1 Required test equipment

1. Color television or monitor
2. Oscilloscope: wide-band, dual-trace, triggered delayed sweep
3. Frequency counter
4. Audio oscillator
5. Audio voltmeter
6. Digital voltmeter
7. Signal generator: RF/IF sweep/marker
8. Signal generator: PAL color bar, stairstep, video sweeper
9. Signal generator: Audio multiplex TV signal generator
10. Recording tape
11. Alignment tape: MH-2
12. Presetting unit (PTU94008)



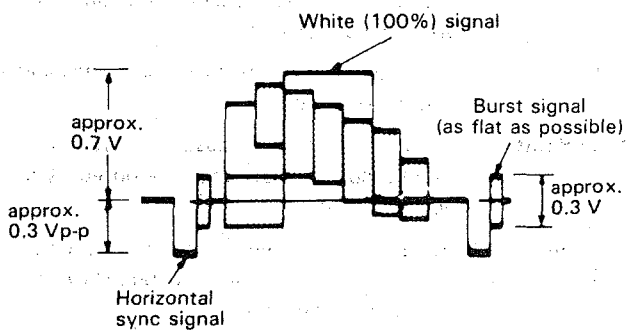


Fig. 2-1-1 Color bar signal of pattern generator

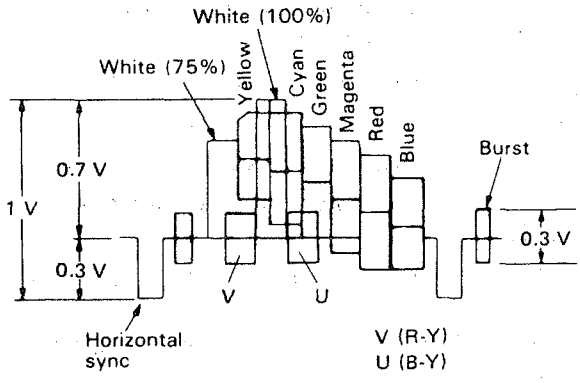


Fig. 2-1-2 Color bar signal waveform

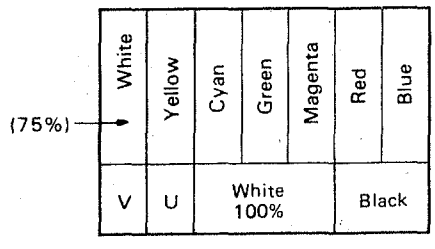


Fig. 2-1-3 Color bar pattern

2.1.2 Check and adjustment steps

The check and adjustment steps are provided in the following in the form of charts. For clarity, the nomenclature used in the charts is outlined below.

No. Checks and adjustments are numbered in the recommended sequence in which they are to be performed.

Item Name assigned to the particular check and adjustment step.

Check Point Location to which measuring instrument (oscilloscope unless otherwise noted) is to be connected.

Adjustment Parts Variable component (resistor, capacitor, etc.) to be adjusted in this step. Dash (—) indicates check only.

Signal & Mode

- Input signal required to perform adjustment. Dash (—) indicates that special signal is not required.
- Equipment operating mode at time of check or adjustment.

Color bars	Color bars signal as video input.
Stairstep	Stairstep signal as video input.
1 kHz	1 kHz sinewave as audio input signal.
MH-2 color bars	Color bars segment of MH-2 alignment tape.
MH-2 stairstep	Stairstep segment of MH-2 alignment tape.
MH-2 1 kHz	1 kHz audio signal segment of MH-2 alignment tape.
MH-2 RF sweep	RF sweep segment of MH-2 alignment tape.
E-E	Power on and machine in Stop mode.
REC	Recording mode
PB	Playback mode
SEARCH	Search (FWDS and REVS) playback mode
SLOW	Slow motion playback mode
STILL	Pause during playback mode
SP mode	SP recording speed

Description This column provides an explanation of the step, notes and adjustment values.

2.2 SWITCHING REGULATOR CIRCUIT

Note: *Unless otherwise specified, all test points and adjustments are located on the SWITCHING REGULATOR board.*

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	5 V DC output voltage	TP1 TP3 (GND)	R37 (DC 5V)	•REC •SOURCE SEL: TUNER	1) Connect a digital voltmeter between TP1 and TP3 (GND). 2) Record in the TUNER mode, adjust R37 for 5.3 ± 0.05 V.

2.3 TIMER CIRCUIT

Note: *Unless otherwise specified, all test points and adjustments are located on the TIMER board.*

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	Clock	IC1-16	C6 (Timer clock)	•E-E	Note: *For below adjustments use 1 : 1 probe with input capacitance less than 100 pF.* 1) Connect a frequency counter between IC1-16 and GND. 2) Short TP1 to GND, then short the leads of capacitor C3 once in order to reset IC1. All FDP Segments and power LED are on. 3) Adjust C6 for 2048.000 ± 0.002 Hz (488.2808 to 488.2818 μs).

2.4 SERVO CIRCUIT

Note: *Unless otherwise specified, all test points and adjustments are located on the MAIN board.*

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	SP PB switching point	VIDEO OUT	R420 (SP SW point)	• PB • MH-2 (stairstep) • Trigger slope (–) • SP mode • AUTO TRACKING : OFF	1) Connect an oscilloscope to VIDEO OUT. 2) Play back the stairstep segment of MH-2 alignment tape. 3) Trigger the oscilloscope externally (– slope) with the signal from TP411. 4) Adjust R420 to position the trigger point 6.5 ± 0.5H from V. sync.
2	SP slow tracking preset	Monitor-TV	Presetting unit (PTU 94008)	• SP mode • REC then PB (slow) • AUTO TRACKING : OFF • SOURCE SEL : AUX	**Note:** *Set VCR to A mode by remote controller. During playback press the PAUSE button for "more than 2 seconds" to begin a slow motion playback.* 1) Set recording video tape into the cassette housing. 2) Receive a color broadcast on a VHF-HI channel or supply a color bar signal to VIDEO IN. 3) Record a color broadcast or color bar signal in the SP mode. 4) Play back recorded signal in the FWD slow mode and set the tracking control of the FRONT panel to the center position by simultaneously pressing the (+) and (–) tracking buttons. 5) Observe the display on a monitor-TV and adjust for optimum noise condition (best tracking) by depressing "B (–)" or "C (+)" buttons of presetting unit as required. 6) Depress the STOP button on the FRONT panel. 7) Confirm that the bar noise is not visible on the monitor in the slow mode.

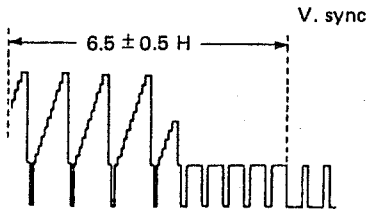


Fig. 2-4-1 Switching point

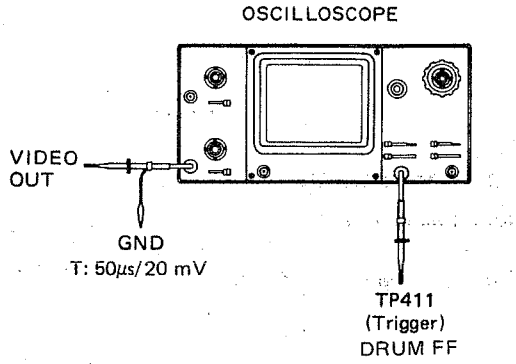


Fig. 2-4-2 Oscilloscope

2.5 VIDEO CIRCUIT

Note: *1. Unless otherwise specified, all test points and adjustment parts are lo cated on the MAIN board.*
2. T indicates the time and volts division setting of the oscilloscope (Use 10 : 1 probe).

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	REC color level and ch balance	L201- Ⓐ (VIDEO UNIT board)	R220 (SP REC color)	• PB mode • MH-2 color bar • SP mode	1) Connect an oscilloscope to L201- Ⓐ (IC201-19) pin as shown in Fig. 2-5-1 and observe color signal level. 2) Set the MH-2 alignment tape into the cassette housing, play back the color bar segment of MH-2 alignment tape. 3) Set the tracking of the FRONT panel to the Auto tracking off position by simultaneously pressing the "+" and "–" tracking buttons. 4) Adjust by pressing the "+" and "–" tracking buttons of the Front panel for maximum level of the color waveform and make a note of the higher color level "A". 5) Press the STOP button on the FRONT panel and eject the MH-2 alignment tape.
				• REC then PB • MH-2 color level • AUTO TRACKING : OFF • SP mode • SOURCE SEL : AUX	6) Set recording video cassette into the cassette housing. Supply a color bar signal to VIDEO IN. 7) Trigger the oscilloscope externally with the signal from TP411 (DRUM FF) of the Main board. Use (–) trigger for CH1 and (+) trigger for CH2. 8) Record a color bar signal in the SP mode. 9) Play back recorded color bar signal. Set the tracking of the FRONT panel to the Auto tracking off position by simultaneously pressing the "+" and "–" tracking buttons and confirm 85 ± 5% of the noted color level at IC201-19. If necessary, before recording, adjust R220 so that the higher level channel becomes 85 ± 5% of the noted level "A" during playback as shwon in Fig. 2-5-2. At this time, confirm that the channel level difference is within 3 dB. **Note:** ***Repeat the above step (9) several times.***
2	YNR NC balance	TP21 (IC1-26) (VIDEO UNIT board)	R16 (NC BAL) (VIDEO UNIT board)	• E-E • SOURCE SEL: AUX • Color bar • SP mode • AUTO TRACKING : OFF	1) Supply a color bar signal to VIDEO IN and connect an oscilloscope to TP21 (IC1-26 pin). 2) Adjust R16 for minimum DC step difference. T: 2ms/5mV

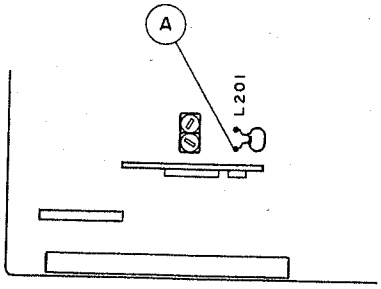


Fig. 2-5-1 Component view of VIDEO UNIT board

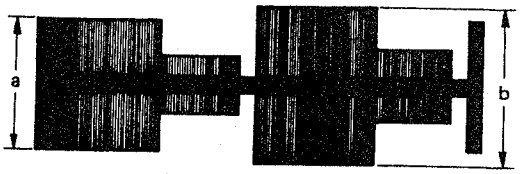


Fig. 2-5-2 REC color level

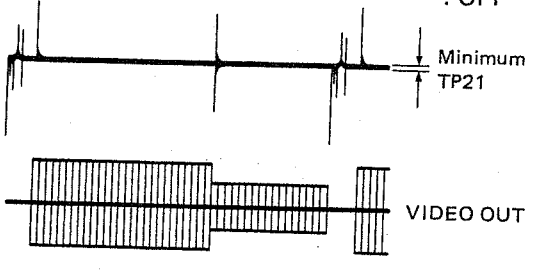


Fig. 2-5-3

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
3	SP PB Frequency	VIDEO OUT (TP210)	R226 (SP FREQ)	• REC then PB • Video sweep • AUTO TRACKING : OFF • SOURCE SEL : AUX • SP mode	1) Terminate VIDEO OUT with monitor - TV (75 Ω load), supply a video sweep signal without burst to VIDEO IN. 2) Set recording video cassette into the cassette housing. Record a video sweep signal without burst in the SP mode. 3) Connect an oscilloscope to VIDEO OUT. Play back recorded video sweep signal in the SP mode, set the tracking of the Front panel to the Auto tracking off position by simultaneously pressing the (+) and (–) tracking buttons. 4) Use the control of the oscilloscope to position the 100 kHz region at graduation 3 (0 dB) of the oscilloscope scale. 5) Adjust R226 to position the 2 MHz of channel-1 portion at 2.4 – 3.0 (–1 ± 1 dB) of the oscilloscope graduations as shown in Fig. 2-5-4. At this time, confirm that the channel difference is within 3 dB.
			R226	• REC then PB • TV broadcast • AUTO • TRACKING : OFF • SP mode • SPURCE SEL :AUX	**Alternate method** 1) Set recording video cassette into the cassette housing, receive a colour broadcast on a VHF channel. 2) Record a colour broadcast that shows a good depiction of human facial contours. 3) Play back recorded colour broadcast, set the tracking of the Front panel to the Auto tracking off position by simultaneously pressing the (+) and (–) tracking buttons. 4) Adjust R226 to obtain distinct facial features on the monitor. **Note:** ***R226 nearly at centre position.***
4	SECAM DET.	IC251-18 (VIDEO UNIT board)	LC251 (SECAM DET) (VIDEO UNIT board)	• E-E • SECAM color bar	1) Connect an oscilloscope to pin 18 of IC251. 2) Adjust LC251 so that A and B are related as follows: A : B = 3 : 4 = 0.84 Vp-p : 1.11 Vp-p

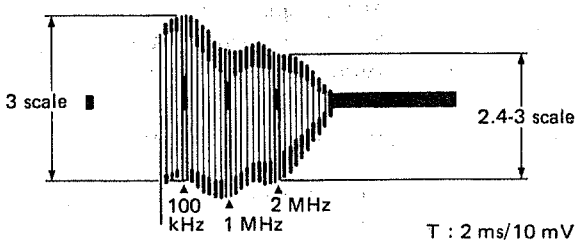


Fig. 2-5-4 PB frequency

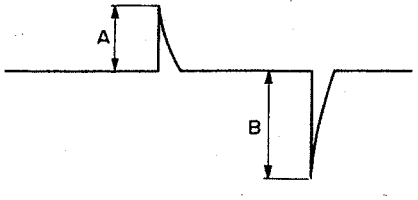


Fig. 2-5-5

2.6 AUDIO CIRCUIT

Note: *Unless otherwise specified, all test points and adjustments are located on the MAIN board.*

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	Audio Bias Level	TP31 (+) TP32 (–)	R11 (Bias adj)	• SOURCE SEL : AUX • SP mode • REC mode • No signal	1) Connect a millivoltmeter between TP31 and TP32. 2) Set for REC mode without incoming signal. 3) Adjust R11 for 1.9 mVrms.

2.7 TUNER/IF CIRCUIT

Note: *Unless otherwise specified, all test points and adjustments are located on the IF board.*

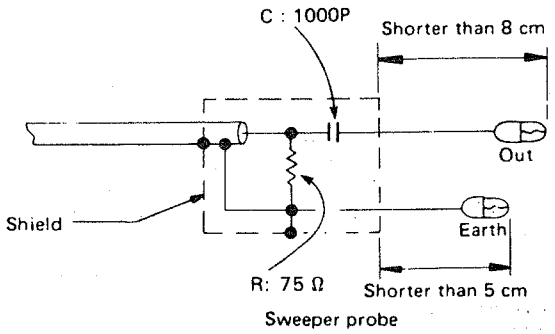
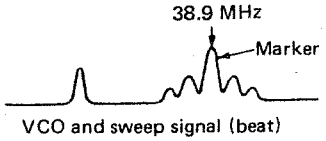
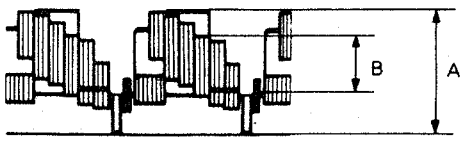
<table>
<tr><th>No.</th><th>Item</th><th>Check Point</th><th>Adjustment Parts</th><th>Signal & Mode</th><th>Description</th></tr>
<tr><td colspan="6">Equipment required:
1. Oscilloscope
2. IF sweep signal genrator with suitable markers (PIF, etc.)
3. Sweeper probe (sweep signal supply cable) as shown below.
 

Fig. 2-7-1</td></tr>
<tr><td rowspan="2">1</td><td rowspan="2">VCO</td><td rowspan="2">IC1-28</td><td rowspan="2">T2 (VCO)
 

VCO and sweep signal (beat)
Fig. 2-7-2</td><td>• Sweep genrator out: 70 dBμ (38.9 MHz)
• Tuner mode without antenna IN</td><td>1) Use a sweeper probe as shown in Fig. 2-7-1 and connect the sweep generator output to pin 1 of SAW 1.
Adjust the sweep gain so that the waveform does not distort as observed with the oscilloscope.
Connect the oscilloscope to pin 28 of IC1 (VIDEO DET OUT) and adjust T2 to align the waveform with the frequency marker as shown in Fig. 2-7-2.</td></tr>
<tr><td>• TV broadcast
• Tuner mode</td><td>Alternate method:
1) Receive a color broadcast on a VHF-HI channel.
2) Adjust T2 to obtain a fine picture on the monitor.</td></tr>
</table>

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
• **Before the following adjustments:** 1. Connect a cable to ANT IN and terminate TV OUT at 75 Ω. 2. Set a TV channel signal generator as follows. Video : 65 dBμ/75 Ω, color bar 87.5% modulation Audio : 55 dBμ/75 Ω, 1 kHz ± 50 kHz deviation					
2	RF AGC	IF terminal of Front end	R21 (RF AGC)	• TV signal • Tuner mode	1. Connect the oscilloscope to IF terminal of UHF Tuner (Front end). Adjust R21 for maximum level, then again adjust R21 for –5 dB again.
		MONITOR	R21	• TV broadcast • Tuner mode	**Alternate method:** **Note:** *Adjust R21 (RF AGC) to correct for excess noise in the picture or when streaky cross interference occure bue to strong electrical fields.* 1. Adjust R21 to minimize noise or streaks on the TV screen. 2. Check for absence of abnormality on all channels.
3	AFC	IC1-16	T3 (AFC)	• TV broadcast • Tuner mode	1. Receive a color broadcast or signal generator on a VHF-HI channel. 2. Connect oscilloscope to pin 16 of IC1. 3. Set the oscilloscope to DC mode and adjust T3 to set the lower adge of the ripple waveform to 4.5 V.
4	Color Level	CN1-4 (VIDEO OUT) (TUNER CTL board)	R40 (Color level)	• TV signal • Tuner mode • Color bar	1. Receive a color bar signal. Set the Y level for 100% reference signal and then adjust R40 for a magenta level of 48% at pin 4 of CN1.



B: magenta A:B = 1:0.48

Fig. 2-7-3

No.	Item	Check point	Adjustment Parts	Signal & Mode	Description
5	SOUND DET	CN1-7 (TUNER CTL board)	T4 (Sound det)	• TV signal • Tuner mode	1. Use a adjustment circuit as shown in Fig. 2-7-4, connect a distortion meter as shown in Fig. 2-7-4. 2. Adjust T4 for minimum distortion.
		CN1-7 (TUNER CTL board)	T4 (Sound det)	• TV broadcaset • Tuner mode	**Alternate method:** 1. Receive a color broadcast on a VHF-HI channel. Connect an oscilloscope to CN1-7 of the TUNER CTL board. 2. Adjust T4 for maximum level at audio sound.

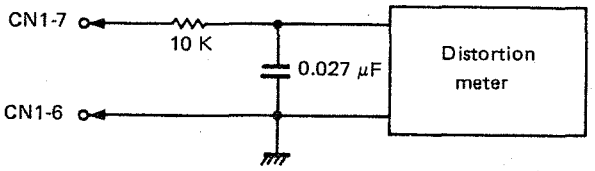
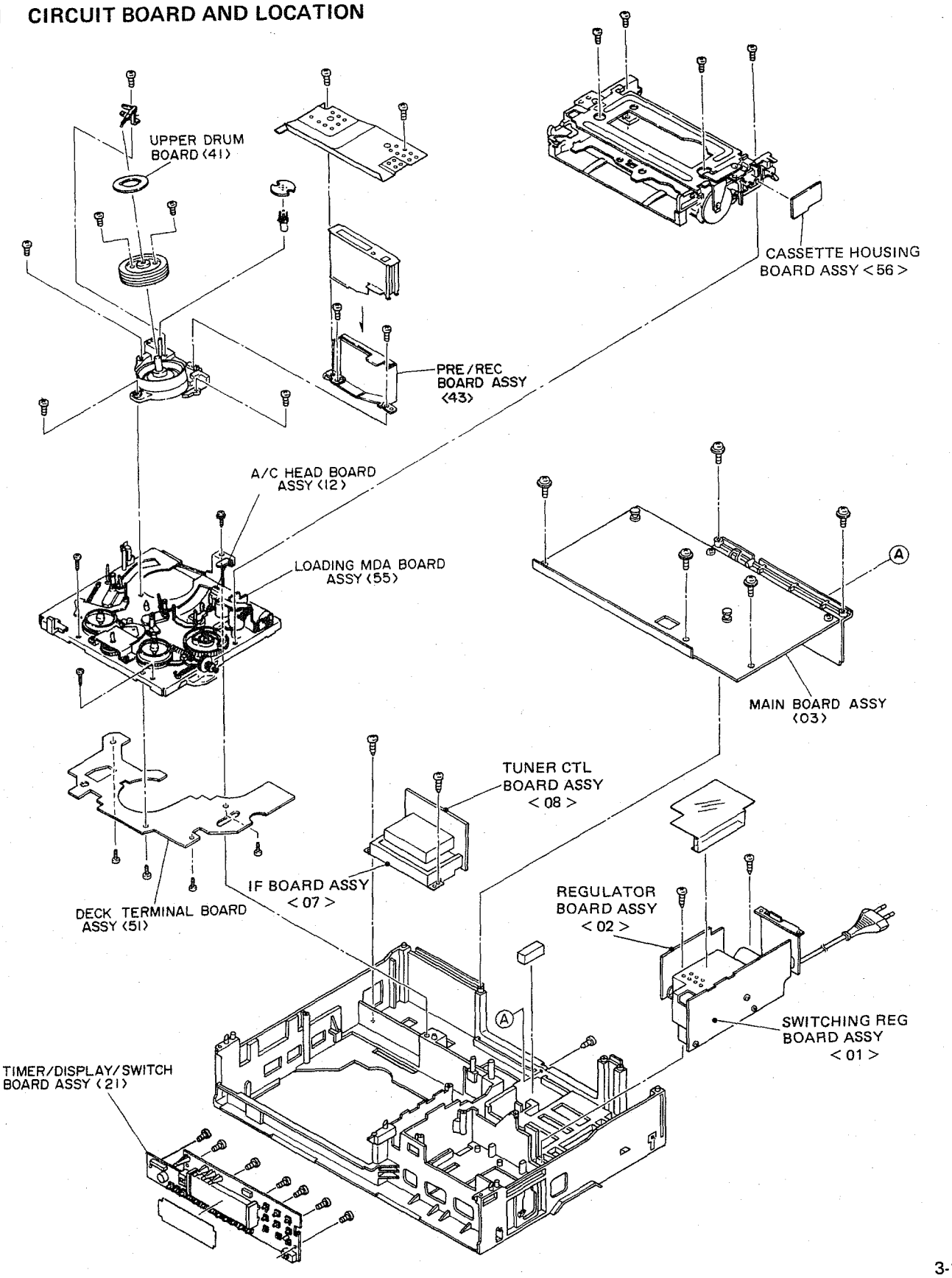


Fig. 2-7-4 Adjustment circuit

SECTION 3
CHARTS AND DIAGRAMS

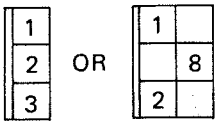
3.1 CIRCUIT BOARD AND LOCATION



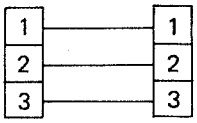
3.2 GENERAL INFORMATION

3.2.1 Connections

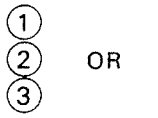
Note:
Unless otherwise specified, only signal input flow is indicated.
Connection arrows indicate only signal outputs.



: Connectors



: Board in connectors



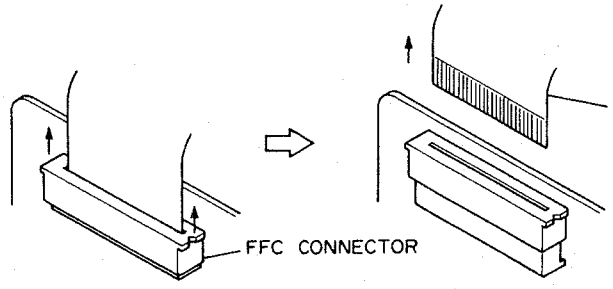
: Direct connections

VS
MS
SM
: Connected pattern in the board.
Abbreviations
V : Video M : Mechacon
S : Servo A : Audio

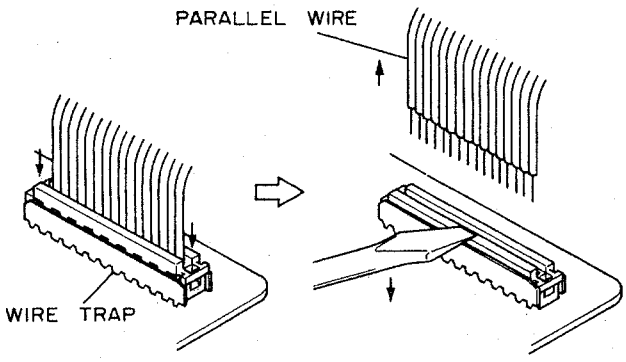
VS : Signal flow from video to servo.

3.2.2 Disconnecting the flatwire

1. Pull the connector structure upward to release the clamp when removing or inserting the flat wire cable.

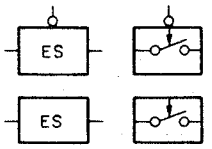


2. Depress the connector structure downward to release the clamp when removing or inserting the flat wire cable, as indicated below.



3.2.3 Indications

AUX : Active only at high.
$\overline{AUX}$: Active only at low.
$\bar{A}\bar{U}\bar{X}$: Active only at middle.
$\bar{A}U\bar{X}$: Active only at open.



: Active only at low for electronic switch.
: Active only at high for electronic switch.

: Low pass filter.
: High pass filter.
: Band pass filter.
: Limiter.
: Detector
: Amplifier.
: Mixer stage.

3.2.4 Schematic diagram values

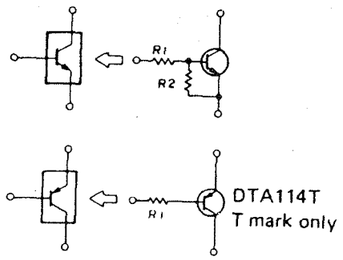
Unless otherwise specified.
1. All resistance values are in ohms, 1/6 W, 1/8 W, (refer to parts list).
2. All capacitance values are in μF, (P; PF).
3. All inductance values are in μH, (m; mH).
4. All diodes are 1SS133 or MA165, (refer to parts list).
5. Voltages are DC-measured (reference to ground) with a digital voltmeter during recording (SP mode) and playback (SP mode) with alignment tape. Where voltages differ between recording and playback, the voltage during playback is shown in parentheses.
6. Waveforms (VIDEO System) are measured (reference to ground) with a color bar during recording (SP mode) and playback (SP mode) with alignment tape.
7. Waveforms (AUDIO System) are measured (reference to ground) with 1 kHz (−8 dBs) during recording and playback with alignment tape (1 kHz).
8. Shaded (▒▒) parts are critical for safety. Replace only with specified parts numbers.

3.2.5 Signal flow in the schematic

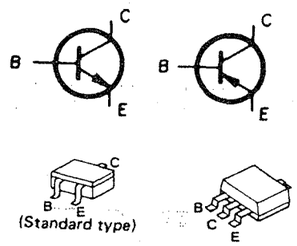
Recording signal path
Playback signal path
REC/PB signal path

3.2.6 Semiconductors

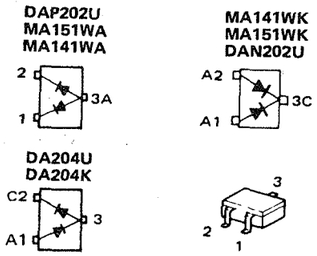
1. Digital transistor



2. Chip transistor



3. Chip diode



Note:
The digital transistor includes built in resistors.
It features small size and high reliability.
Both PNP and NPN types are available.

Uses:
Inverter, Interface, driver circuits.

3.2.7 Replacement of chip parts

For replacing chip parts, proceed it as follows.
Use a well insulated fine-tipped soldering iron (approx. 17 W, 130°C ~ 260°C in temp.).
In addition, it is recommended to use a soldering iron (55 W approx.) with solder absorber for convenience.

Caution:
- Do not apply heat for more than 3 seconds.
- Do not rub electrodes.
- Do not reuse chips removed once. Discard them.
- Supplementary cementing is not required.

1. Soldered condition of chip parts

- Resistors, capacitors, etc.

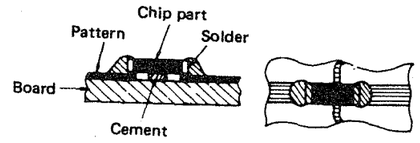


Fig. 3-2-1 Soldering condition-1

- Transistors, diodes, etc.

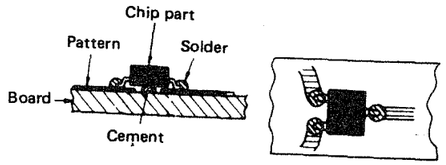


Fig. 3-2-2 Soldering condition-2

2. How to remove chip parts

- Resistors, capacitors, etc.

1) Set a chip parts replacing tool onto the chip parts to hold it down.
2) Unsolder at a side of the chip parts.

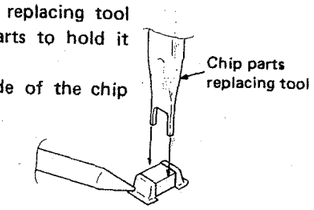


Fig. 3-2-3 R/C removal-1

3) Remove the chip parts by twisting and sliding it.

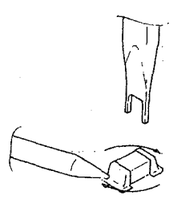


Fig. 3-2-4 R/C removal-2

3. How to remove transistors, diode.

1) Unsolder at the one-lead side of the chip parts.

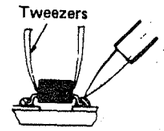


Fig. 3-2-5 Tr/Diode removal-1

2) Lift the unsoldered side upwards.

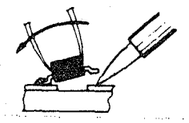


Fig. 3-2-6 Tr/Diode removal-2

3) Heat the other two leads simultaneously and remove the chip parts upwards.

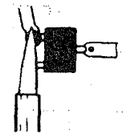


Fig. 3-2-7 Tr/Diode removal-3

4. Preheating and soldering

When setting new chip parts, especially capacitors, but except transistors, preheat them with hot air (150°C approx.) by use of a blower type of hair dryer for about 2 minutes just before soldering. For soldering, use a soldering iron of 30 watt approximately.

5. How to set and solder chip parts

1) Presolder the contact points of the circuit pattern to which the chip parts will be soldered.

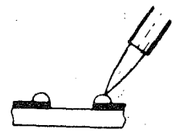


Fig. 3-2-8 Soldering-1

2) Holding down the chip parts with the chip parts replacing tool, solder it with a soldering iron.

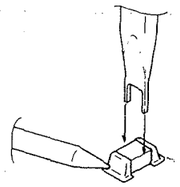
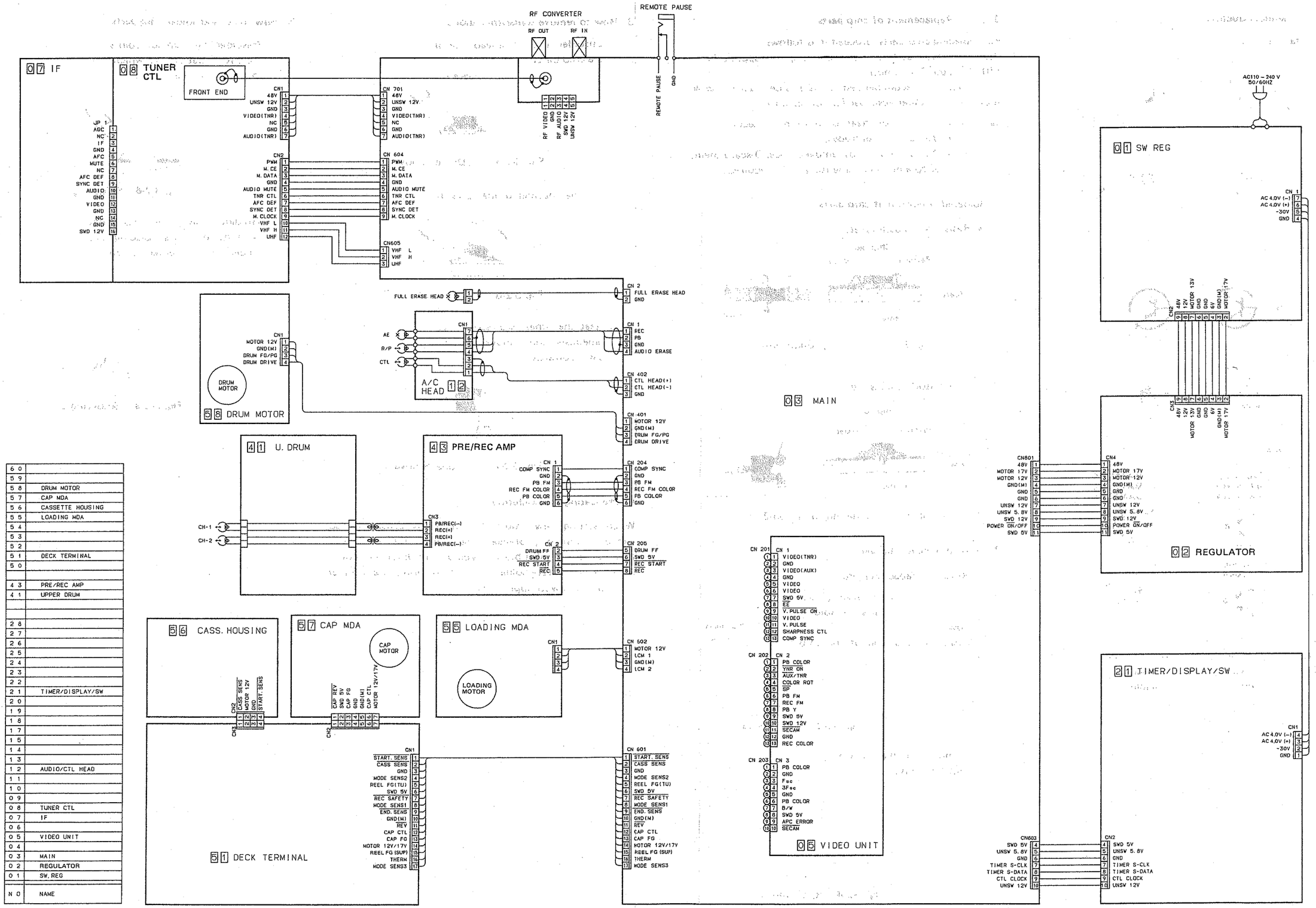


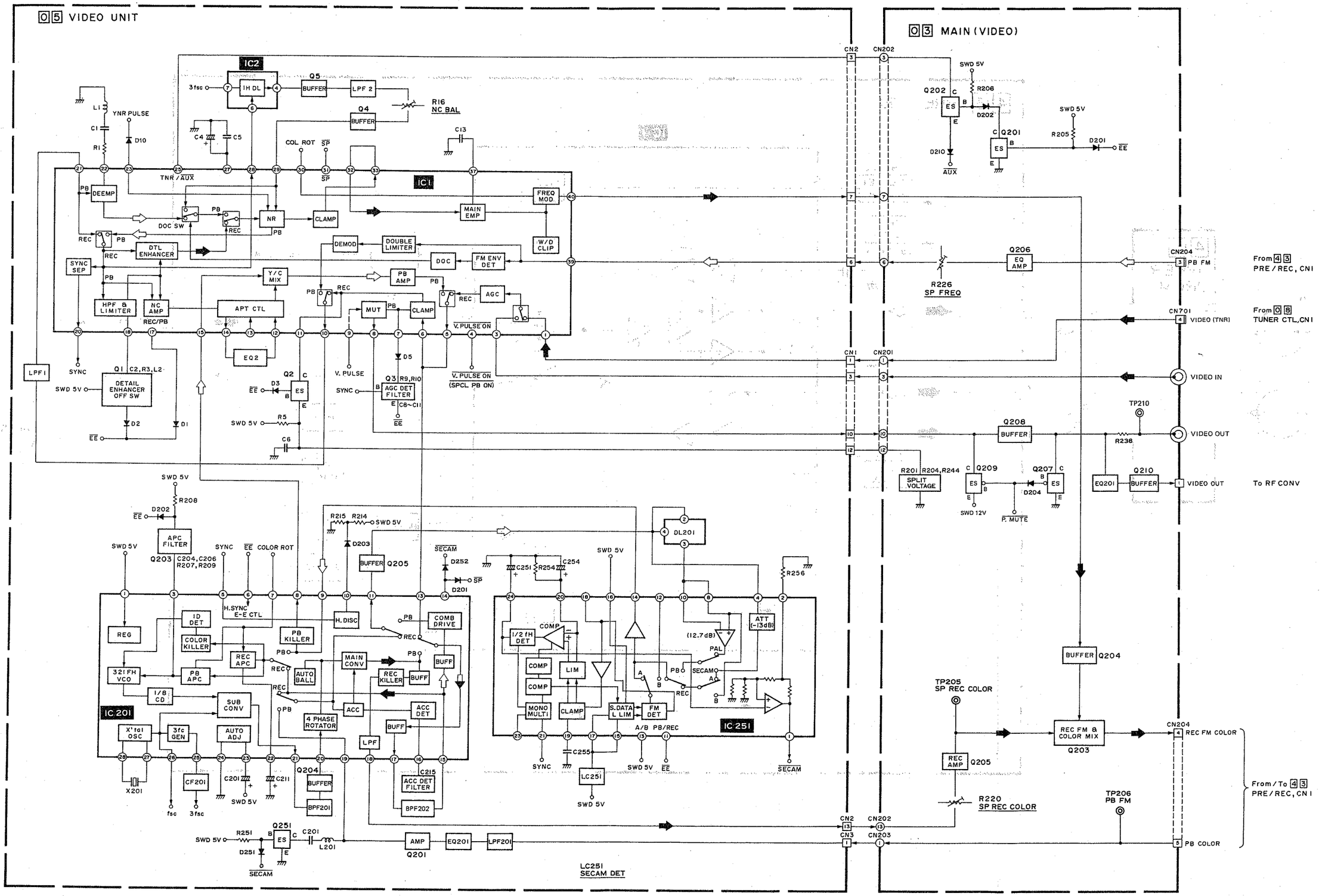
Fig. 3-2-9 Soldering-2

3.3 BOARD INTERCONNECTIONS

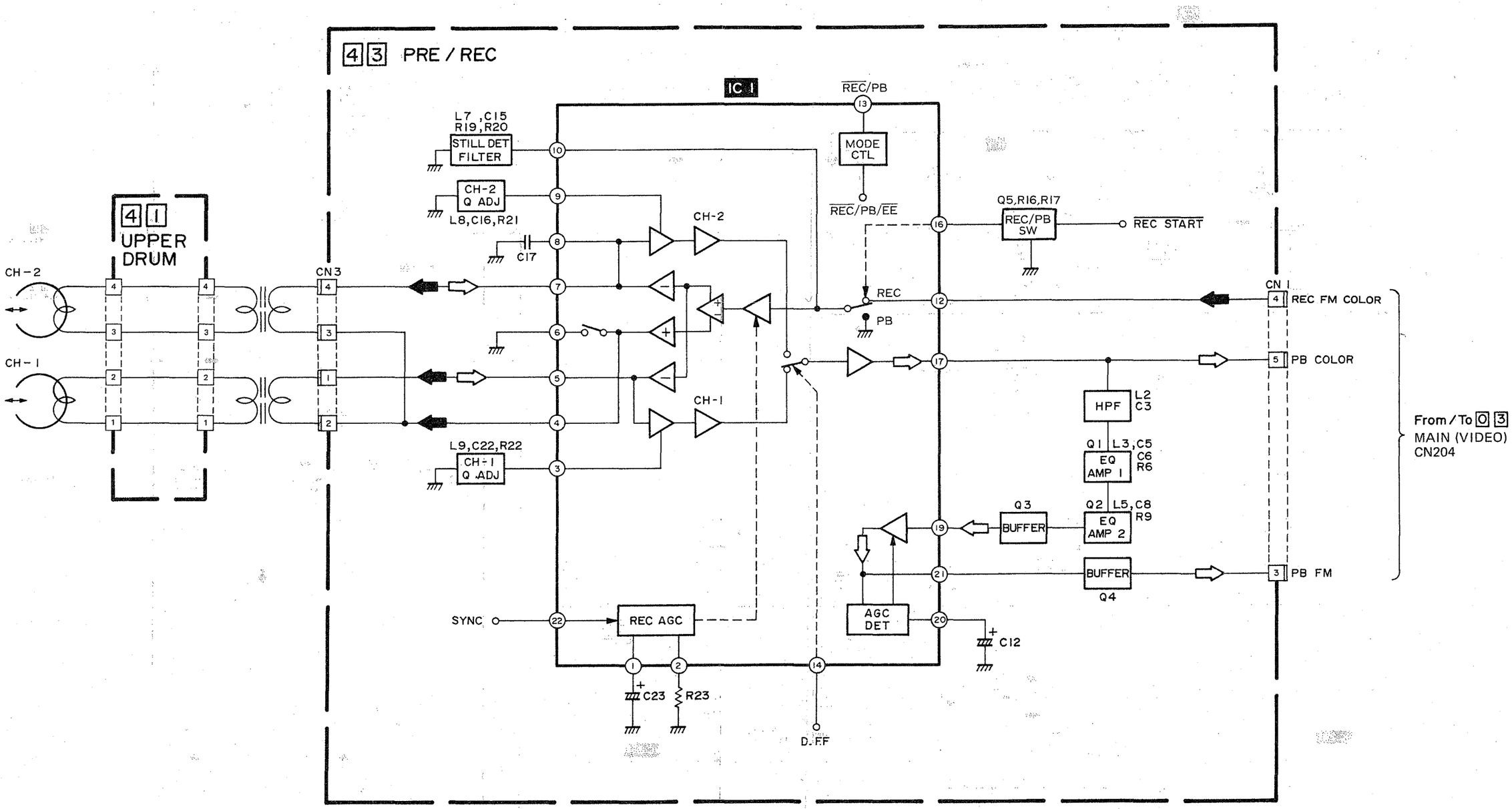


60	
59	
58	DRUM MOTOR
57	CAP MDA
56	CASSETTE HOUSING
55	LOADING MDA
54	
53	
52	
51	DECK TERMINAL
50	
43	PRE/REC AMP
41	UPPER DRUM
28	
27	
26	
25	
24	
23	
22	
21	TIMER/DISPLAY/SW
20	
19	
18	
17	
15	
14	
13	
12	AUDIO/CTL HEAD
11	
10	
09	
08	TUNER CTL
07	IF
06	
05	VIDEO UNIT
04	
03	MAIN
02	REGULATOR
01	SW, REG
NO	NAME

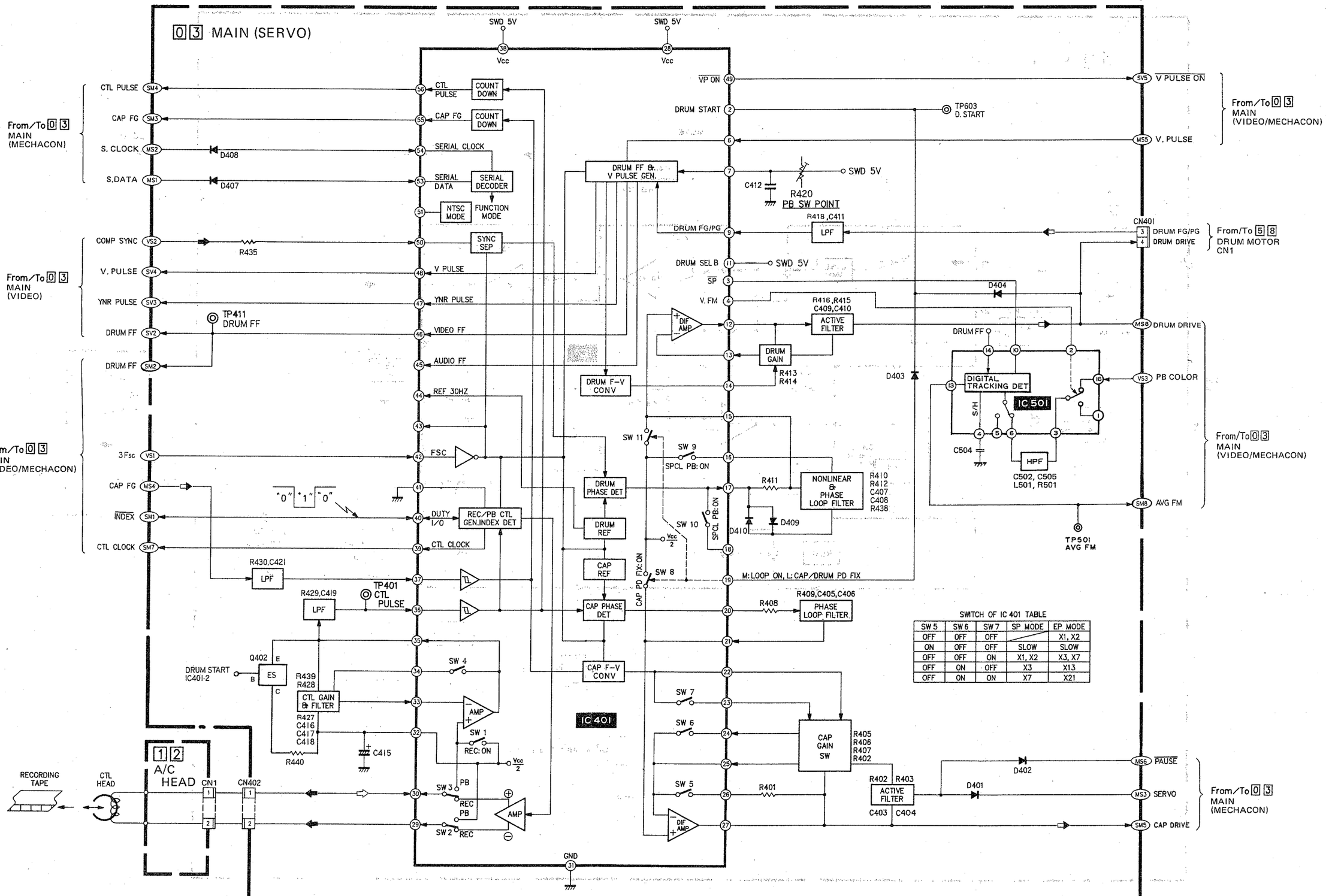
3.4 VIDEO BLOCK DIAGRAM



3.5 PRE/REC BLOCK DIAGRAM

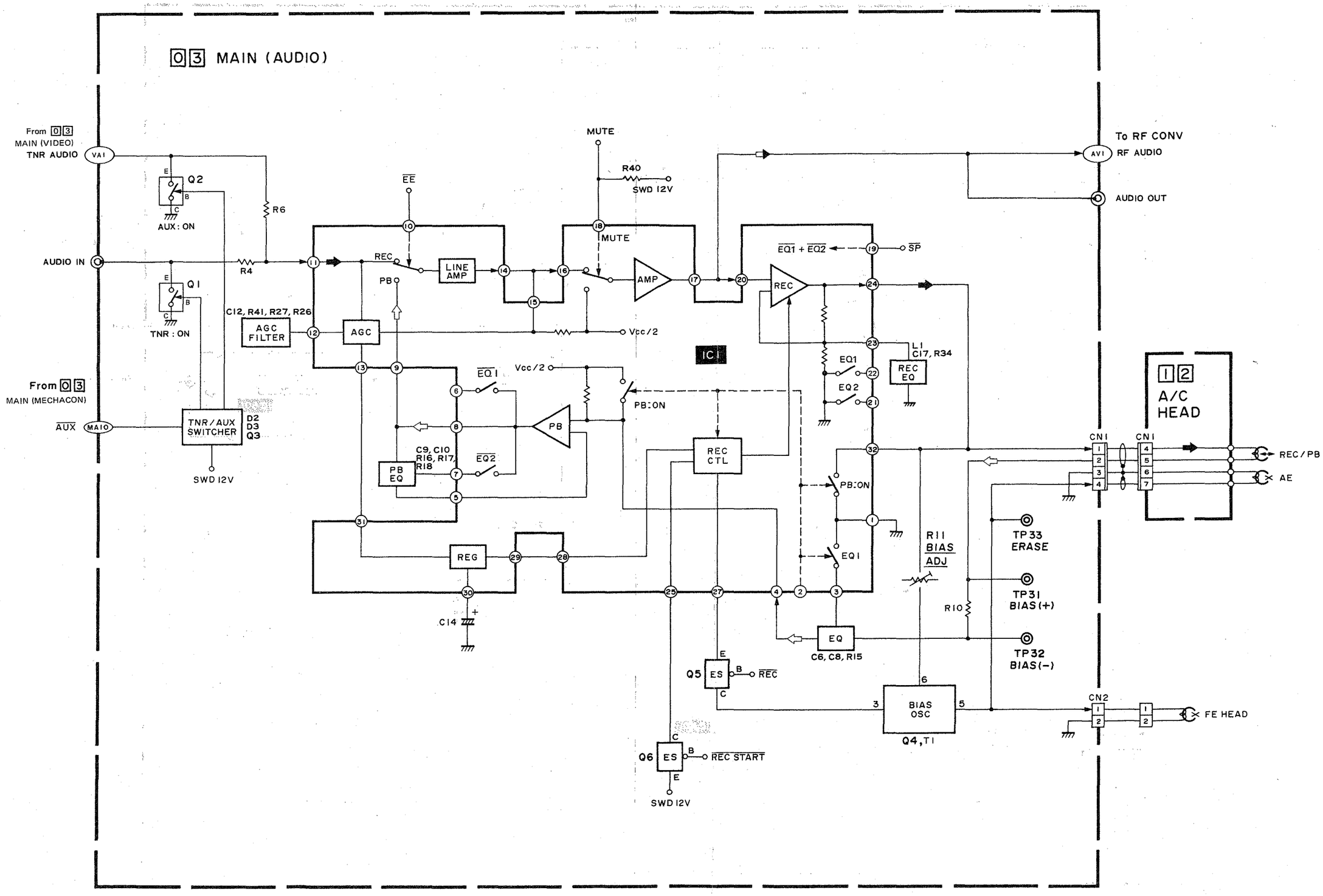


3.6 SERVO BLOCK DIAGRAM

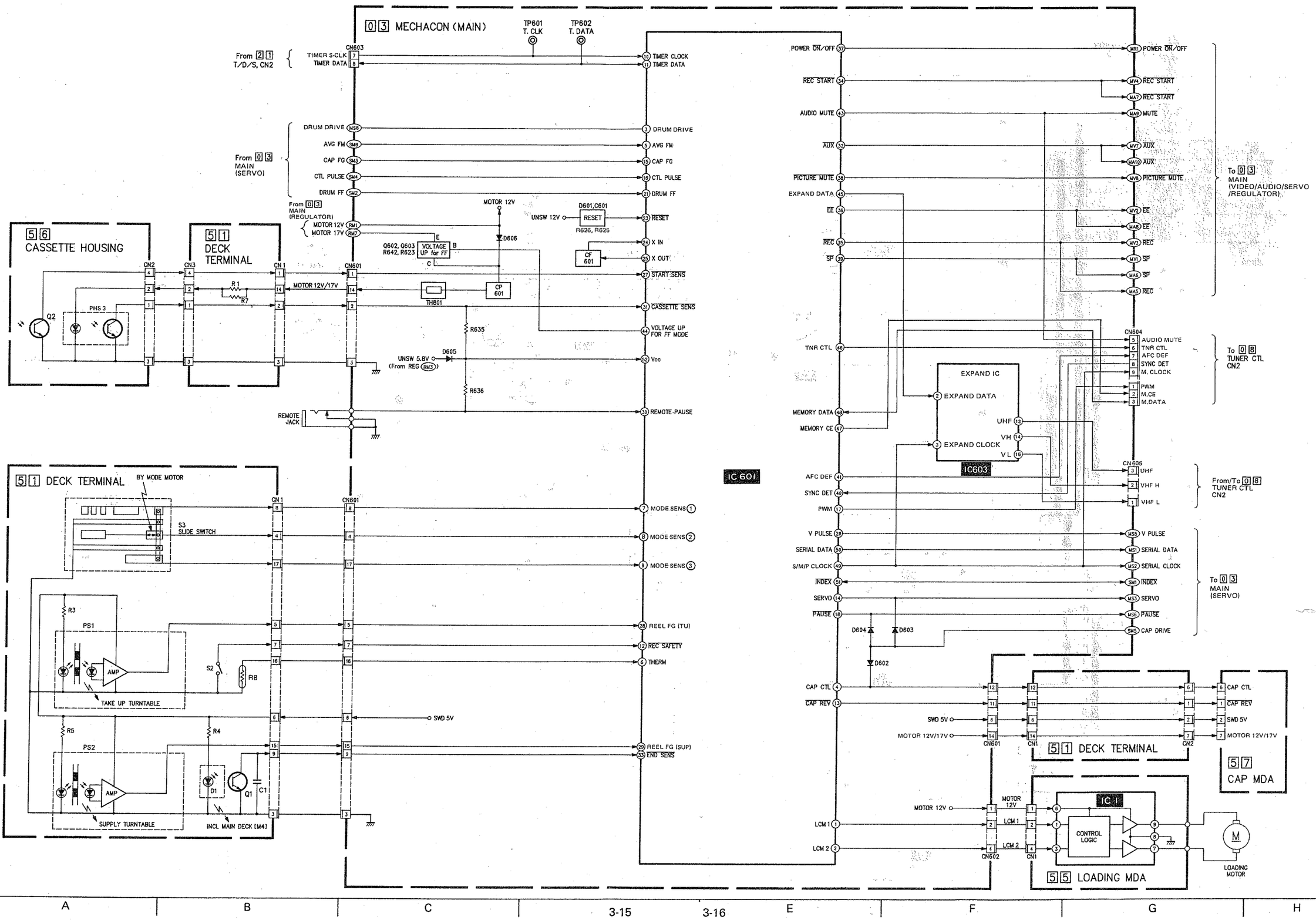


SW 5	SW 6	SW 7	SP MODE	EP MODE
OFF	OFF	OFF		X1, X2
ON	OFF	OFF	SLOW	SLOW
OFF	OFF	ON	X1, X2	X3, X7
OFF	ON	OFF	X3	X13
OFF	ON	ON	X7	X21

3.7 AUDIO BLOCK DIAGRAM

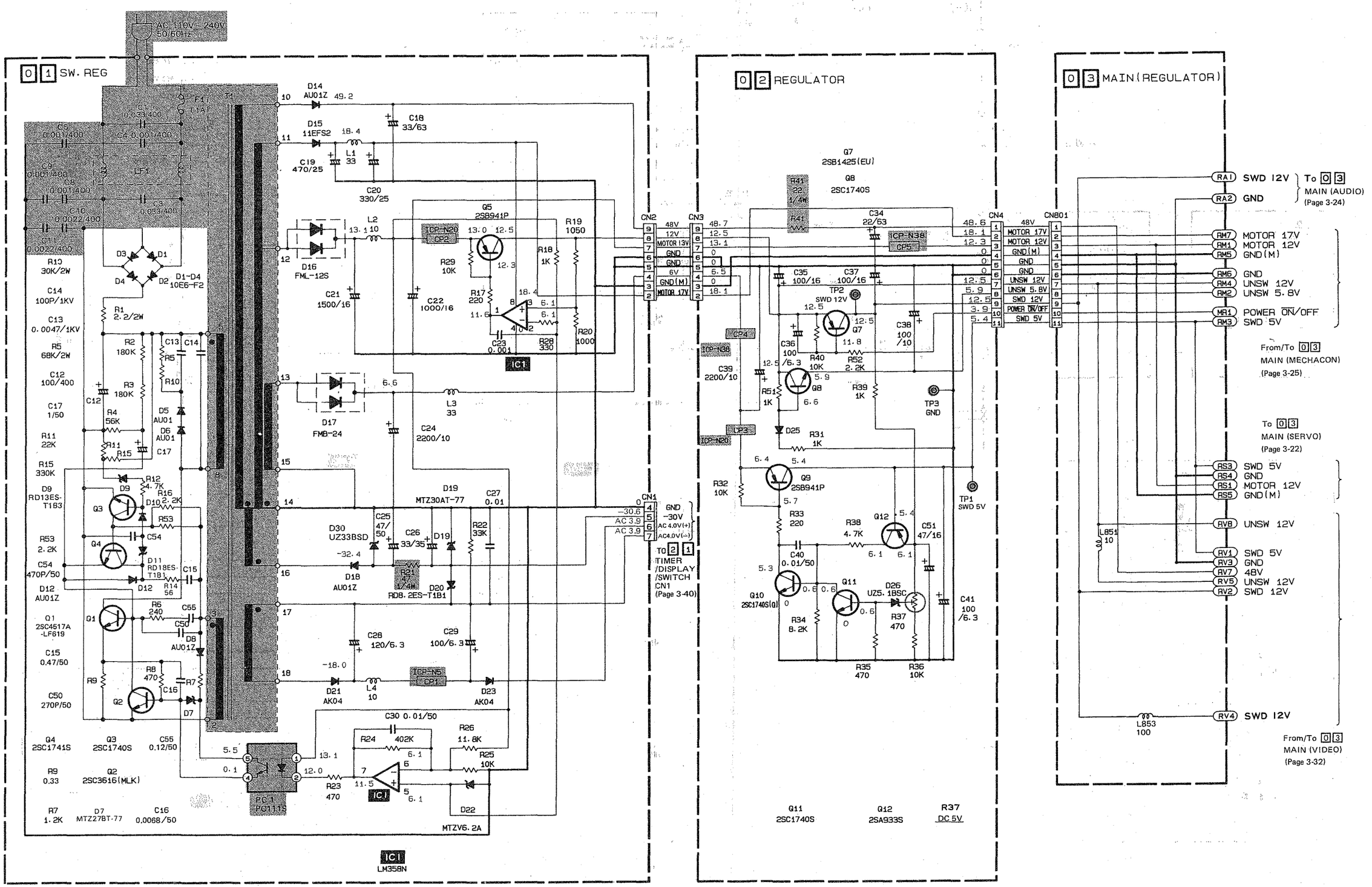


3.8 SYSTEM CTL BLOCK DIAGRAM

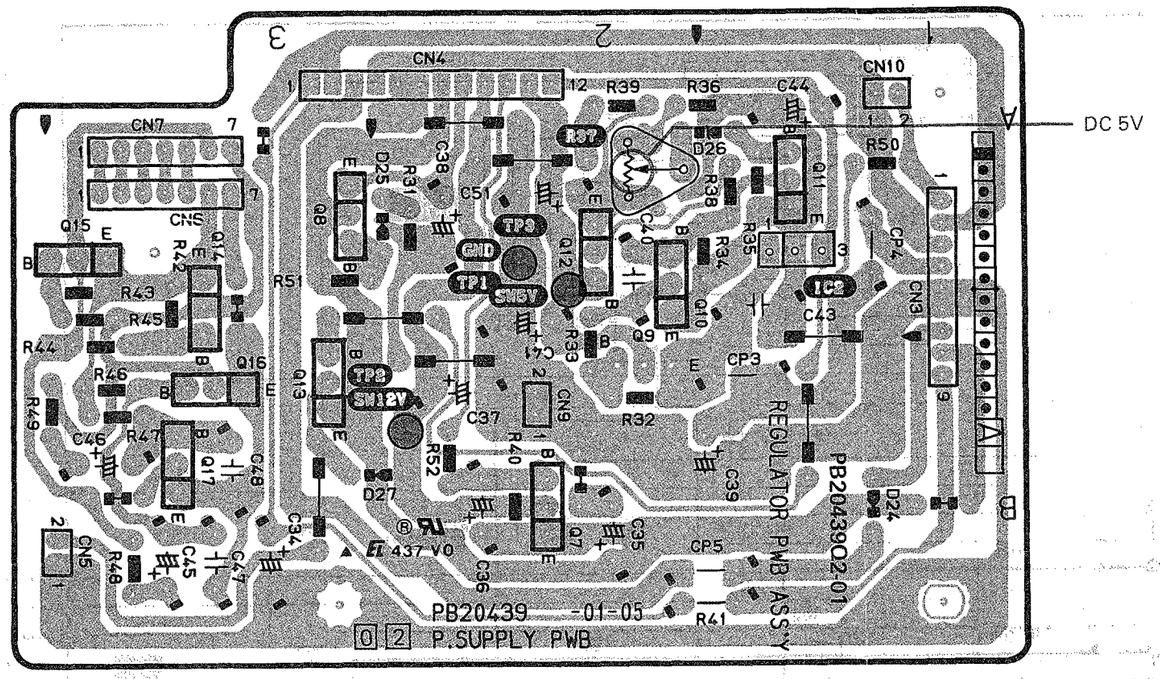


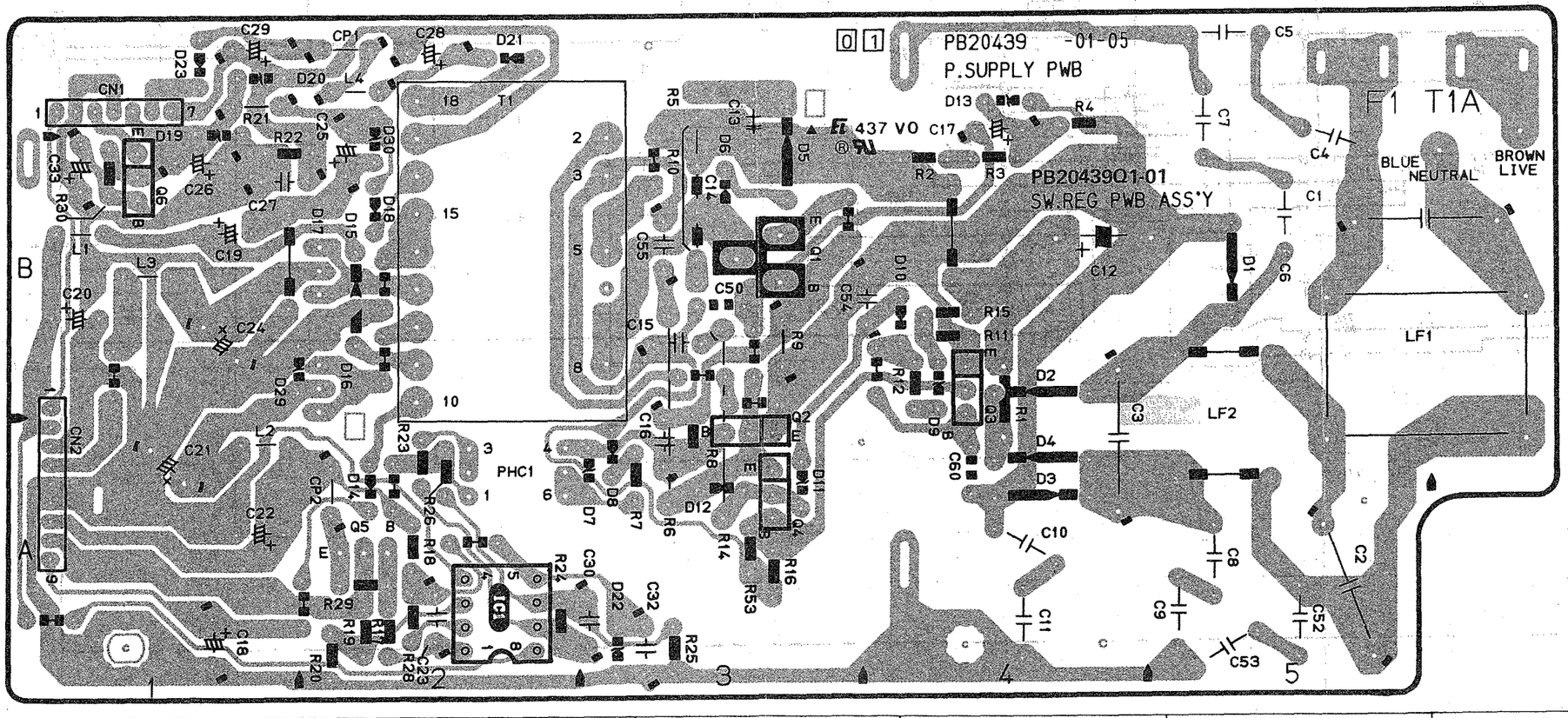
A B C 3-15 3-16 E F G H

3.9 POWER TRANS, POWER TRANSISTOR & REGULATOR (MAIN) SCHEMATIC DIAGRAM

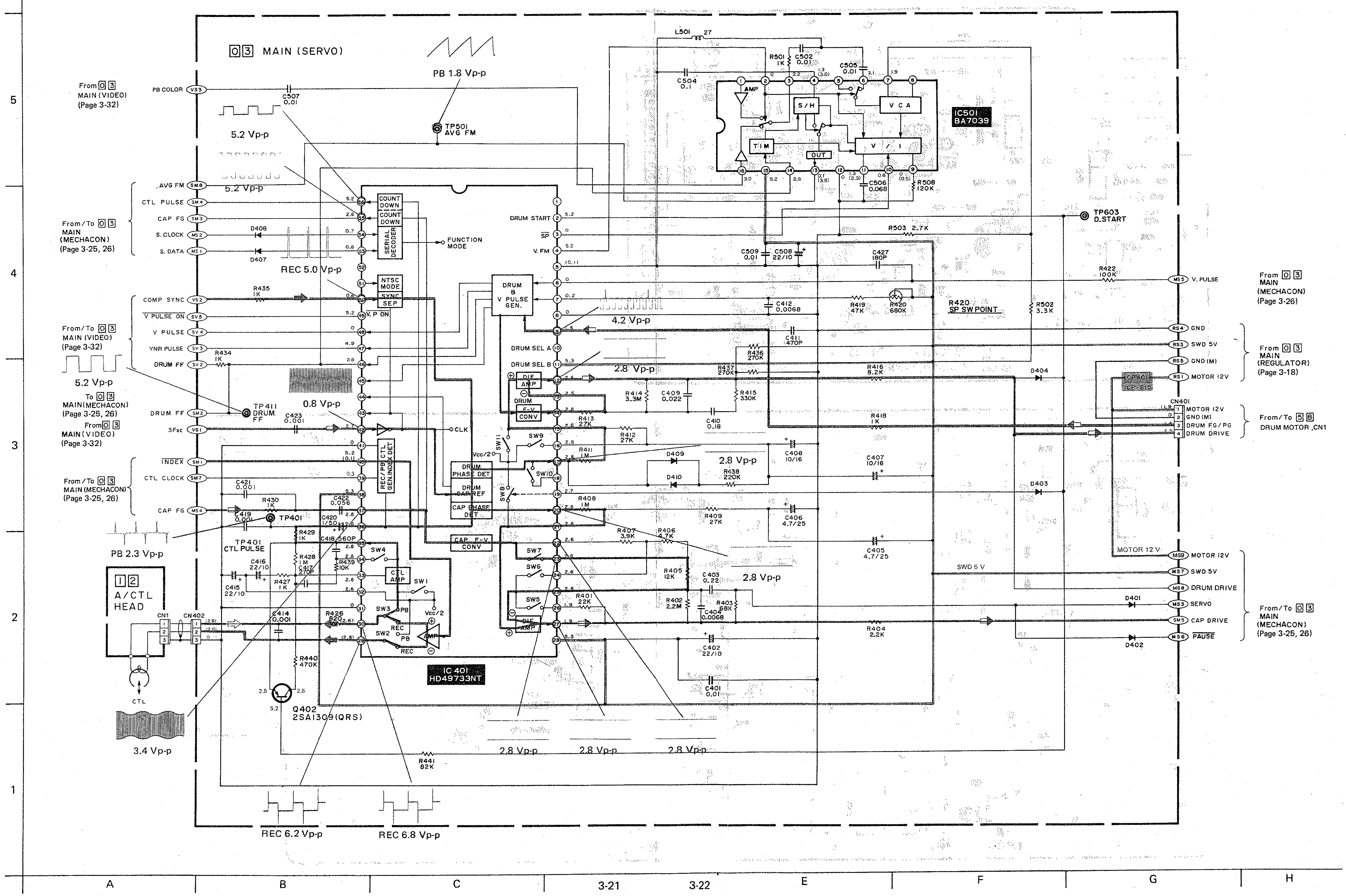


3.10 SWITCHING REGULATOR CIRCUIT BOARD



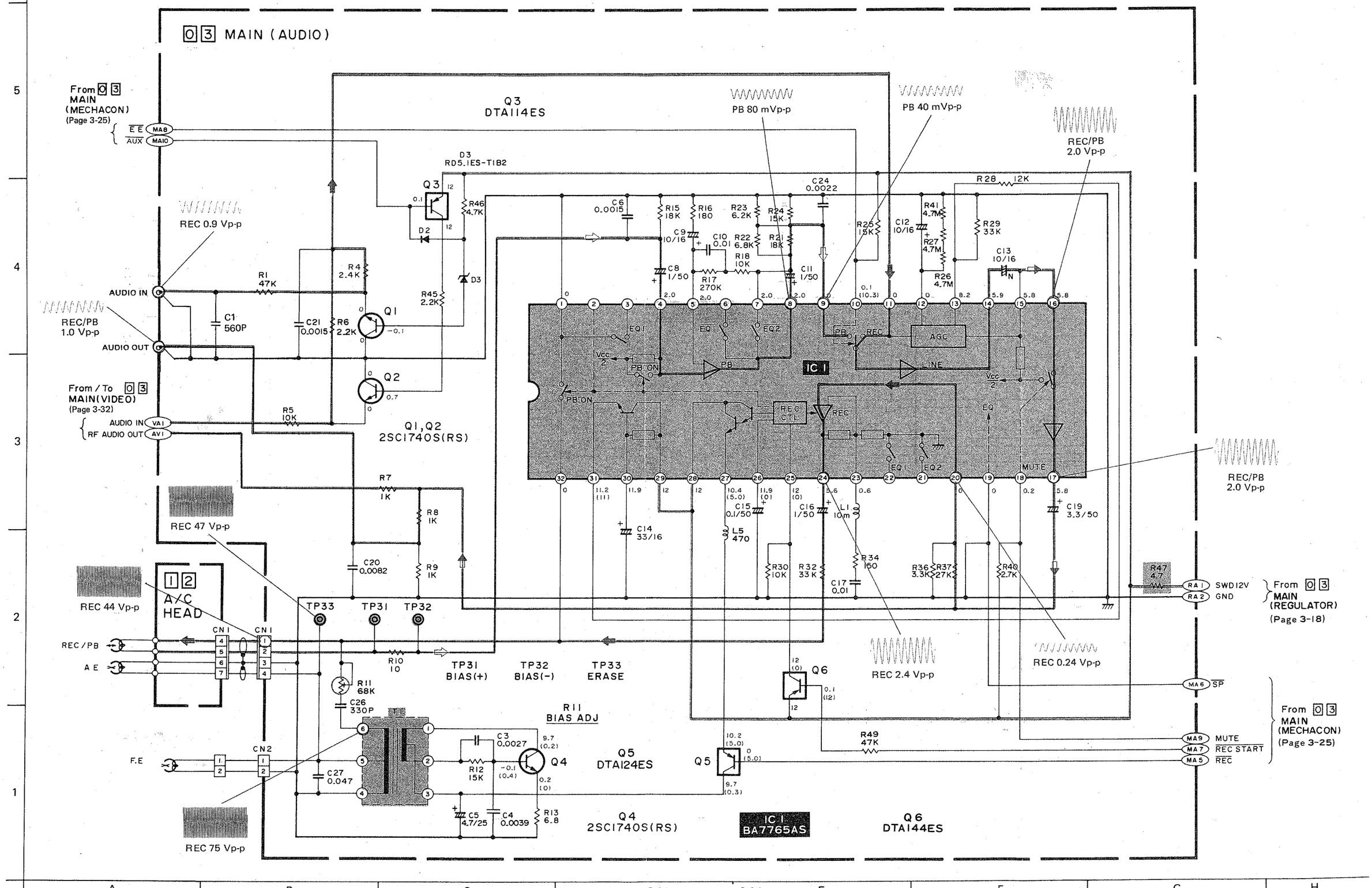


3.11 SERVO SCHEMATIC DIAGRAM



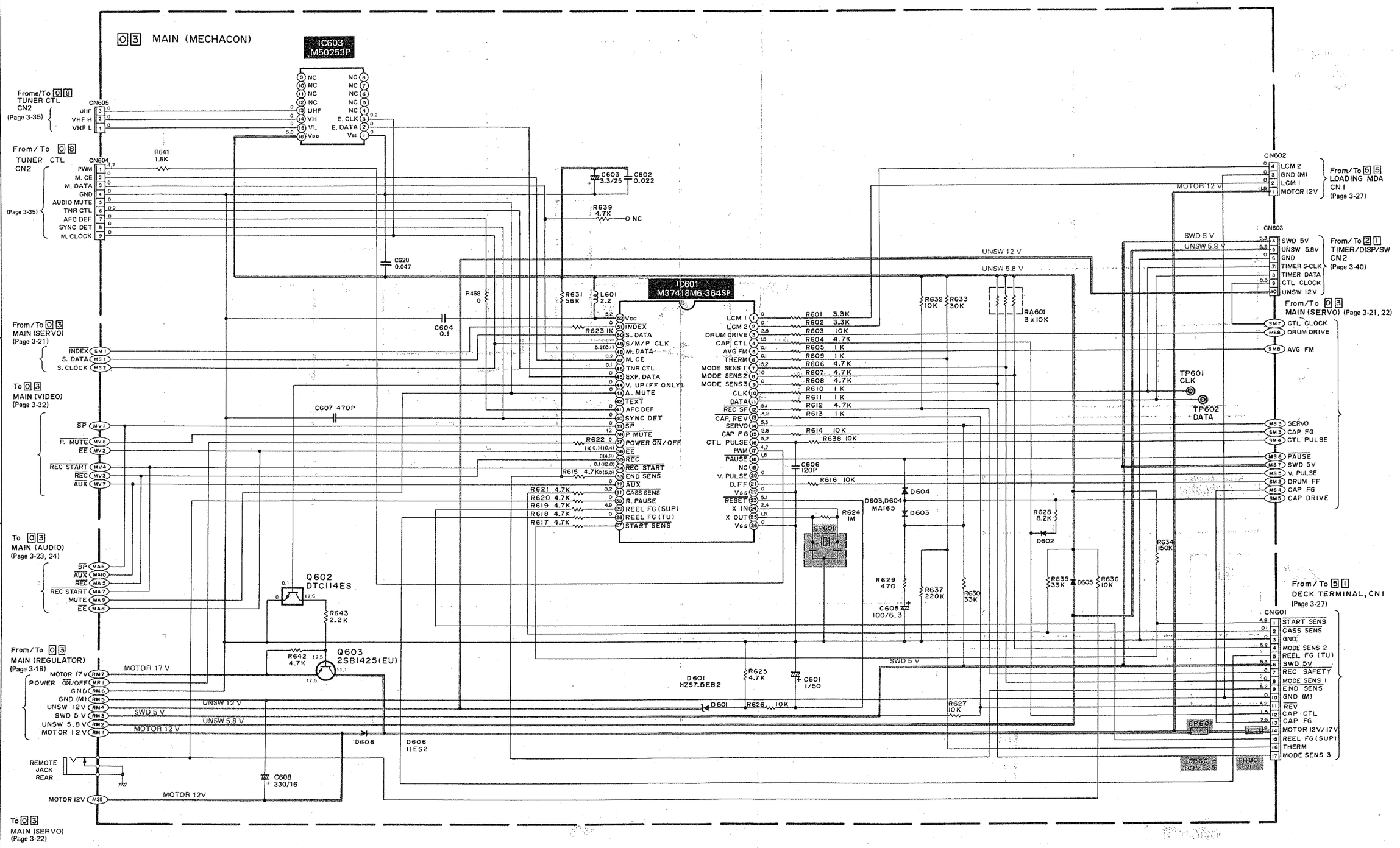
03 MAIN (SERVO)
From 03 MAIN (VIDEO) (Page 3-32)
PB COLOR
VS3
C507 0.01
PB 1.8 Vp-p
TP501 AVG FM
5.2 Vp-p
AVG FM
CTL PULSE
CAP FG
S. CLOCK
S. DATA
From/To 03 MAIN (MECHACON) (Page 3-25, 26)
D408
D407
REC 5.0 Vp-p
COUNT DOWN
SERIAL DECODER
FUNCTION MODE
NTSC MODE
SYNC SEP
V. P ON
COMP SYNC
V PULSE ON
V PULSE
YNR PULSE
DRUM FF
From/To 03 MAIN (VIDEO) (Page 3-32)
R435 1K
R434 1K
To 03 MAIN(MECHACON) (Page 3-25, 26)
TP411 DRUM FF
From 03 MAIN (VIDEO) (Page 3-32)
3Fsc
C423 0.001
0.8 Vp-p
CLK
INDEX
CTL CLOCK
REC/PB CTL GEN.INDEX DET
C421 0.001
R430 1K
C422 0.056
C419 0.001
TP401
C420 1/50
R429 1K
C418 560P
TP401 CTL PULSE
PB 2.3 Vp-p
R428 1M
C416 22/10
R439 10K
C417 270P
R427 1K
C415 22/10
CTL AMP
SW1
SW2
SW3
SW4
Vcc/2
12 A/CTL HEAD
CN1
CN402
C414 0.001
R426 820
AMP
REC
PB
CTL
R440 470K
Q402 2SA1309(QRS)
3.4 Vp-p
R441 82K
IC 401 HD49733NT
REC 6.2 Vp-p
REC 6.8 Vp-p
DRUM START
SP
V. FM
DRUM & V PULSE GEN.
4.2 Vp-p
DRUM SEL A
DRUM SEL B
2.8 Vp-p
DIF AMP
DRUM F-V CONV
DRUM PHASE DET
DRUM CAP REF
CAP PHASE DET
CAP F-V CONV
SW5
SW6
SW7
SW8
SW9
SW10
SW11
L501 27
R501 1K
C502 0.01
C504 0.1
C505 0.01
S/H
V C A
TIM
OUT
V / I
IC501 BA7039
C506 0.068
R508 120K
R503 2.7K
C509 0.01
C508 22/10
C427 180P
C412 0.0068
R419 47K
R420 680K
R420 SP SW POINT
R502 3.3K
C411 470P
R436 270K
R437 270K
R416 8.2K
R414 3.3M
C409 0.022
R415 330K
R413 27K
C410 0.18
R418 1K
R412 27K
R411 1M
D409
D410
R438 220K
C408 10/16
C407 10/16
R408 1M
R409 27K
C406 4.7/25
R407 3.9K
R406 4.7K
C405 4.7/25
R405 12K
C403 0.22
R401 22K
R402 2.2M
C404 0.0068
R403 68K
R404 2.2K
C402 22/10
C401 0.01
TP603 D.START
R422 100K
V. PULSE
From 03 MAIN (MECHACON) (Page 3-26)
GND
SWD 5V
GND (M)
MOTOR 12V
From 03 MAIN (REGULATOR) (Page 3-18)
D404
CP401 (CP-E15)
CN401
DRUM FG/PG
DRUM DRIVE
From/To 58 DRUM MOTOR ,CN1
D403
MOTOR 12 V
SWD 5 V
D401
D402
SERVO
CAP DRIVE
PAUSE
From/To 03 MAIN (MECHACON) (Page 3-25, 26)

3.12 AUDIO SCHEMATIC DIAGRAM



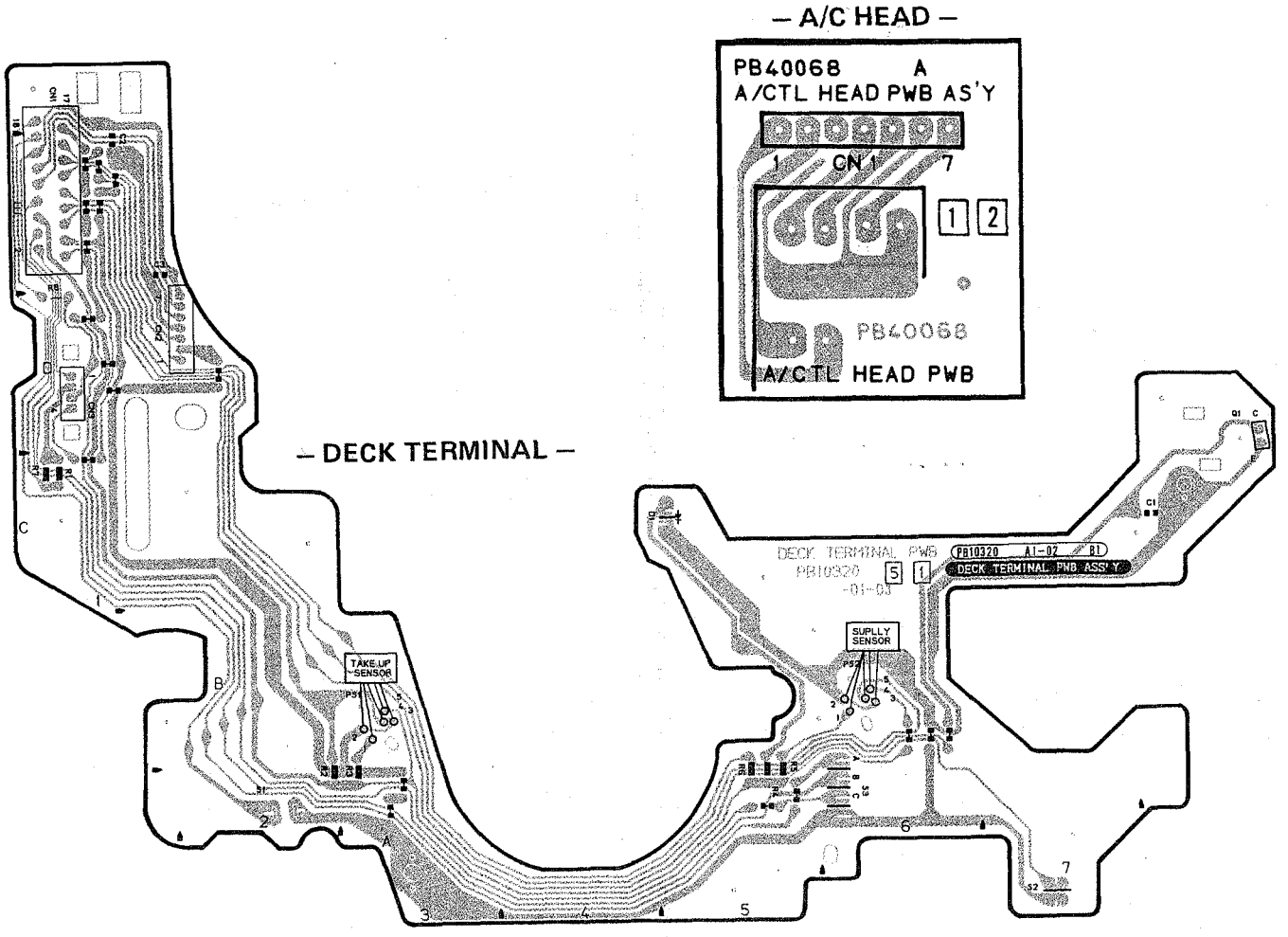
A | B | C | 3-23 | 3-24 | E | F | G | H

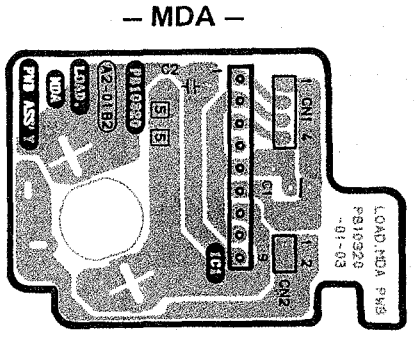
3.13 SYSTEM CTL SCHEMATIC DIAGRAM

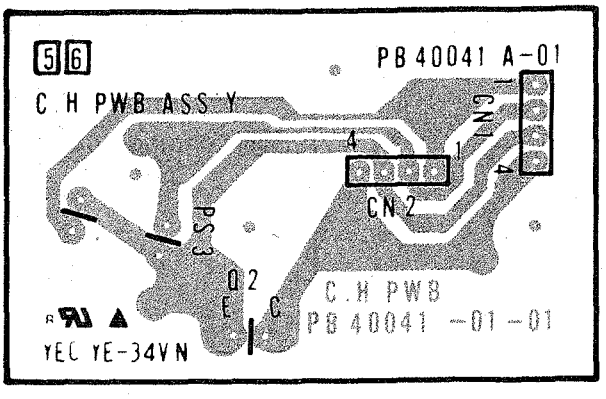


A B C 3-25 3-26 E F G H

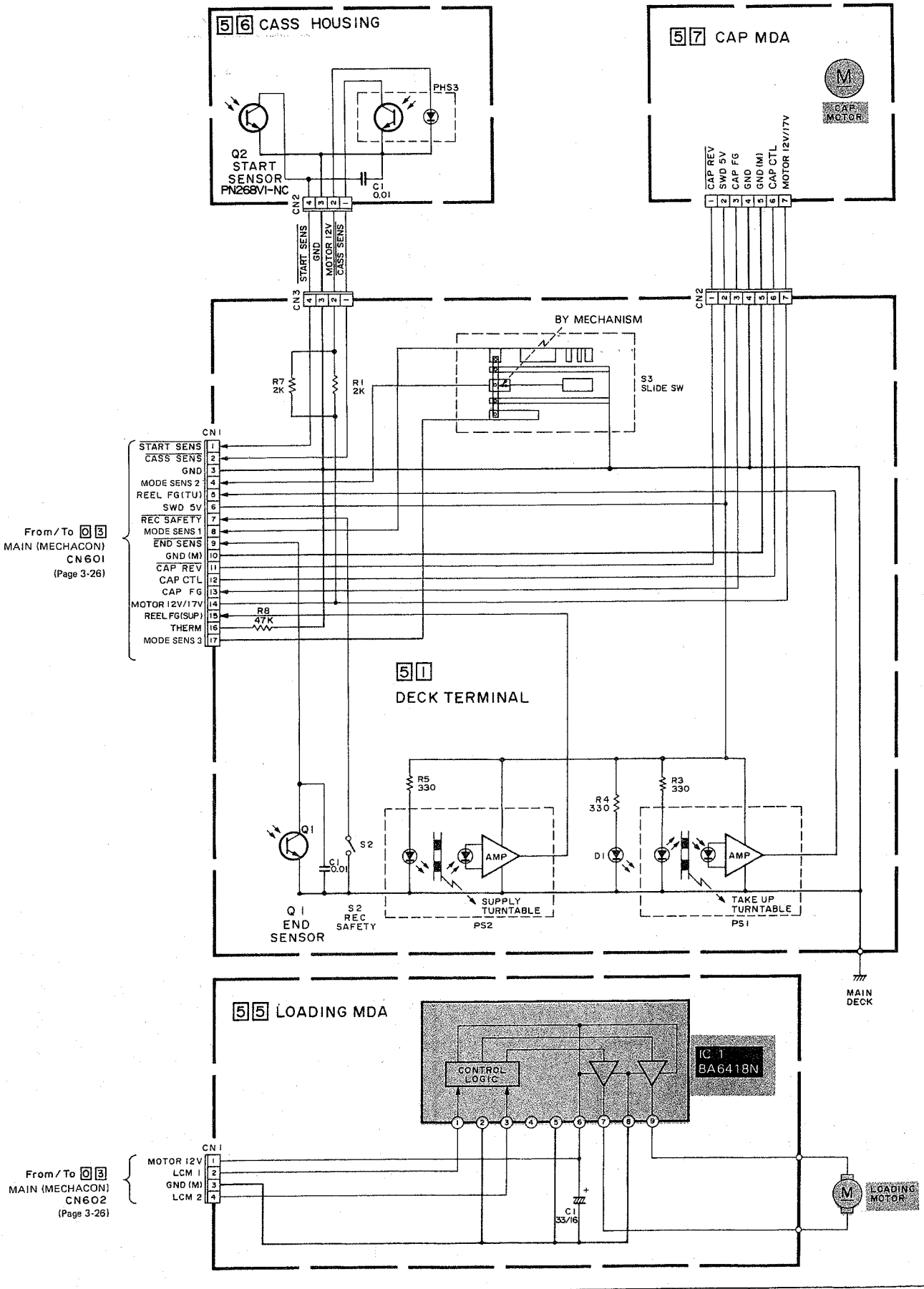
3.15 DECK TERMINAL, MODE MOTOR, C. HOUSING, A/C HEAD CIRCUIT BOARDS



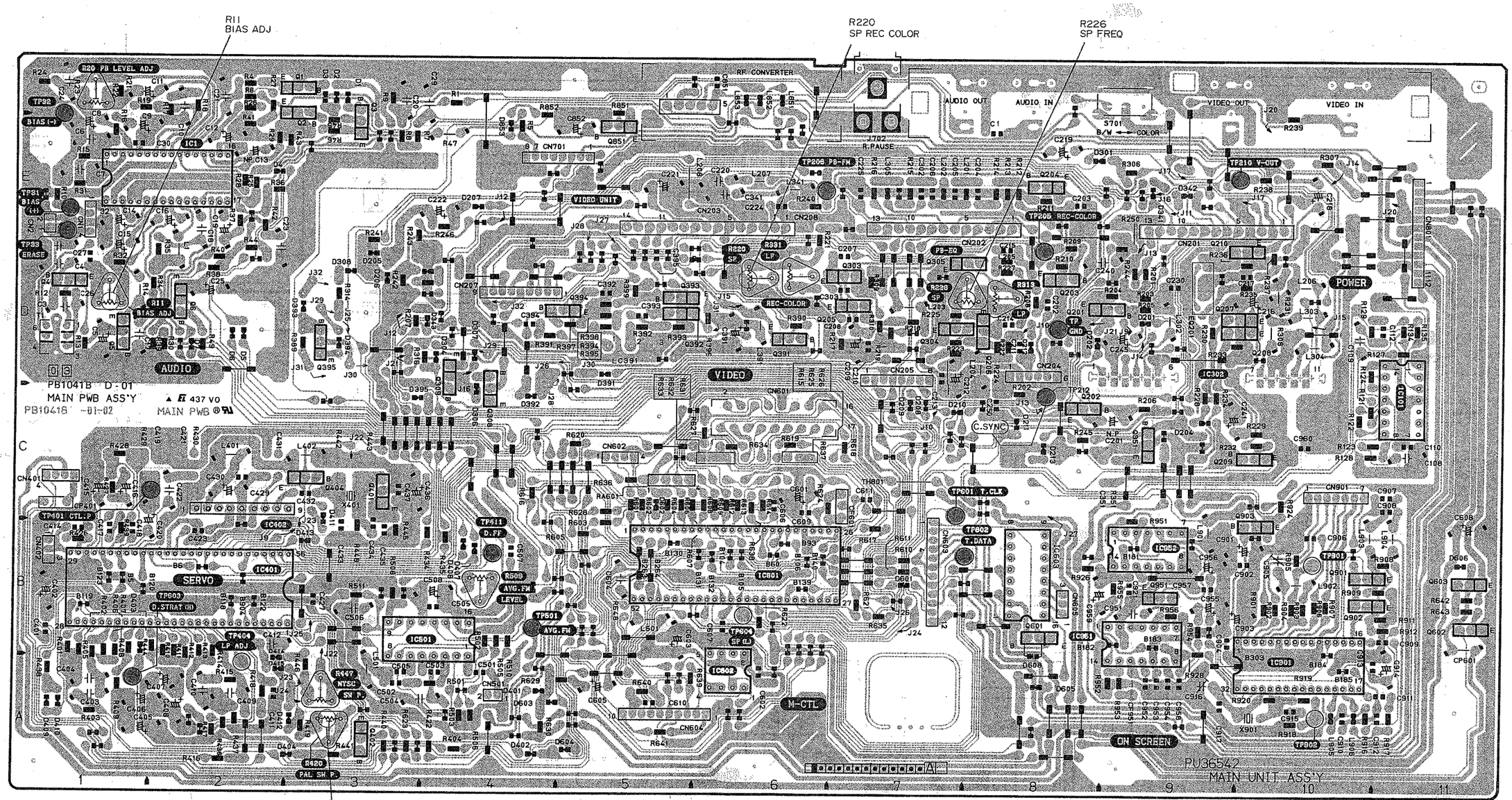




3.14 DECK TERMINAL, MODE MOTOR, CAPSTAN MDA, C. HOUSING SCHEMATIC DIAGRAMS



3.16 MAIN CIRCUIT BOARD



3.17 VIDEO UNIT & VIDEO (MAIN) SCHEMATIC DIAGRAM

● Address of chip parts
1D
└Address

05 VIDEO UNIT

03 MAIN (VIDEO)

IC2 MSM6967RS

IC1 PB20166C-01

IC201 PB20227A

IC251 BA7106LS

Q201 DTC114WS

Q202 DTC144WS

Q206 2SC1740S(RS)

Q209 DTA114ES

Q1 DTA144EU

Q2 2SC2412K

Q3 DTC144EK

Q4 2SA1037K

Q5 2SC2412K

Q203 DTC114WK

Q204 2SC2412K

Q205 2SA1037K

Q207,Q208 2SA933S(RS)

Q204,Q205 2SC1740S(RS)

Q203 2SA933S(RS)

Q210 2SA854S(QR)

PB 1.5 Vp-p

PB 0.44 Vp-p

REC 1.0 Vp-p

REC 0.6 Vp-p

REC/PB 1.0 Vp-p

PB 0.22 Vp-p

REC 0.3 Vp-p

R16 NC BALANCE

REC/PB 5.0 Vp-p

PB 0.48 Vp-p

REC/PB 2.2 Vp-p

PB 1.5 Vp-p

PB 0.18 Vp-p

REC 1.2 Vp-p
PB 1.8 Vp-p

REC 0.48 Vp-p

PB 44 mVp-p

REC 1.0 Vp-p

PB 0.9 Vp-p

REC 0.24 Vp-p
PB 0.2 Vp-p

REC 0.26 Vp-p

PB 0.46 Vp-p

PB 84 mVp-p

PB 0.18 Vp-p

PB 0.25 Vp-p

REC 56 mVp-p

REC 1.0 Vp-p

REC/PB 1.0 Vp-p

CN2 PB COLOR, YNR ON, AUX/TNR, COLOR ROL, SP, PB FM, REC FM, PB Y, SWD 5V, SWD 12V, SECAM, GND, REC COLOR

CN1 VIDEO(TNR), GND, VIDEO(AUX), GND, VIDEO, VIDEO, SWD 5V, EE, V PULSE ON, VIDEO, V PULSE, SHARPNESS CTL, COMP SYNC

CN3 PB COLOR, GND, fsc, 3 Fsc, GND, PB COLOR, B/W, SWD 5V, APC ERROR, SECAM

CN202 PB COLOR, YNR ON, AUX/TNR, COLOR ROL, SP, PB FM, REC FM, PB Y, SWD 5V, SWD 12V, SECAM, GND, REC COLOR

CN201 VIDEO(TNR), GND, VIDEO(AUX), GND, VIDEO, VIDEO, SWD 5V, EE, V PULSE ON, VIDEO, V PULSE, SHARPNESS CTL, COMP SYNC

CN203 PB COLOR, GND, fsc, 3 Fsc, GND, PB COLOR, B/W, SWD 5V, APC ERROR, SECAM

CN204 COMP SYNC, GND, PB FM, REC FM COL, PB COL, GND

C205 DRUM FF, SWD 5V, REC START, REC

MV1 SP — To 03 MAIN (MECHACON) (Page 3-25)

TP GND

RV3 GND — From/To 03 MAIN (REGULATOR) (Page 3-18)

RV1 SWD 5V
RV2 SWD 12V

CN701 AUDIO (TNR), GND, NC, VIDEO (TNR), GND, UNSW 12V, 48V — From/To 08 TUNER CTL CN1 (Page 3-35)

MV7 AUX
MV2 EE — From/To 03 MAIN (MECHACON) (Page 3-25)

VIDEO IN
VIDEO OUT

RV7 48V
RV8 UNSW 12V — From/To 03 MAIN (REGULATOR) (Page 3-18)

RV5 UNSW 12V
RV4 SWD 12V

RF CONV. 1 RF VIDEO IN, 2 GND, 3 RF AUDIO IN, 4 SWD 12V, 5 UNSW 12V

AV1 RF AUDIO
VA1 AUDIO — From/To 03 MAIN (AUDIO) (Page 3-23)

MV8 P.MUTE
MV4 REC START
MV3 REC — From 03 MAIN (MECHACON) (Page 3-25)

From/To 03 MAIN (SERVO) (Page 3-21): V PULSE ON SV5, DRUM FF SV2, V PULSE SV4, YNR PULSE SV3, 3 Fsc VS1, COMP SYNC VS2, PB COLOR VS3

From/To 43 PRE/REC CN1 (Page 3-44)

From/To 43 PRE/REC CN2 (Page 3-44)

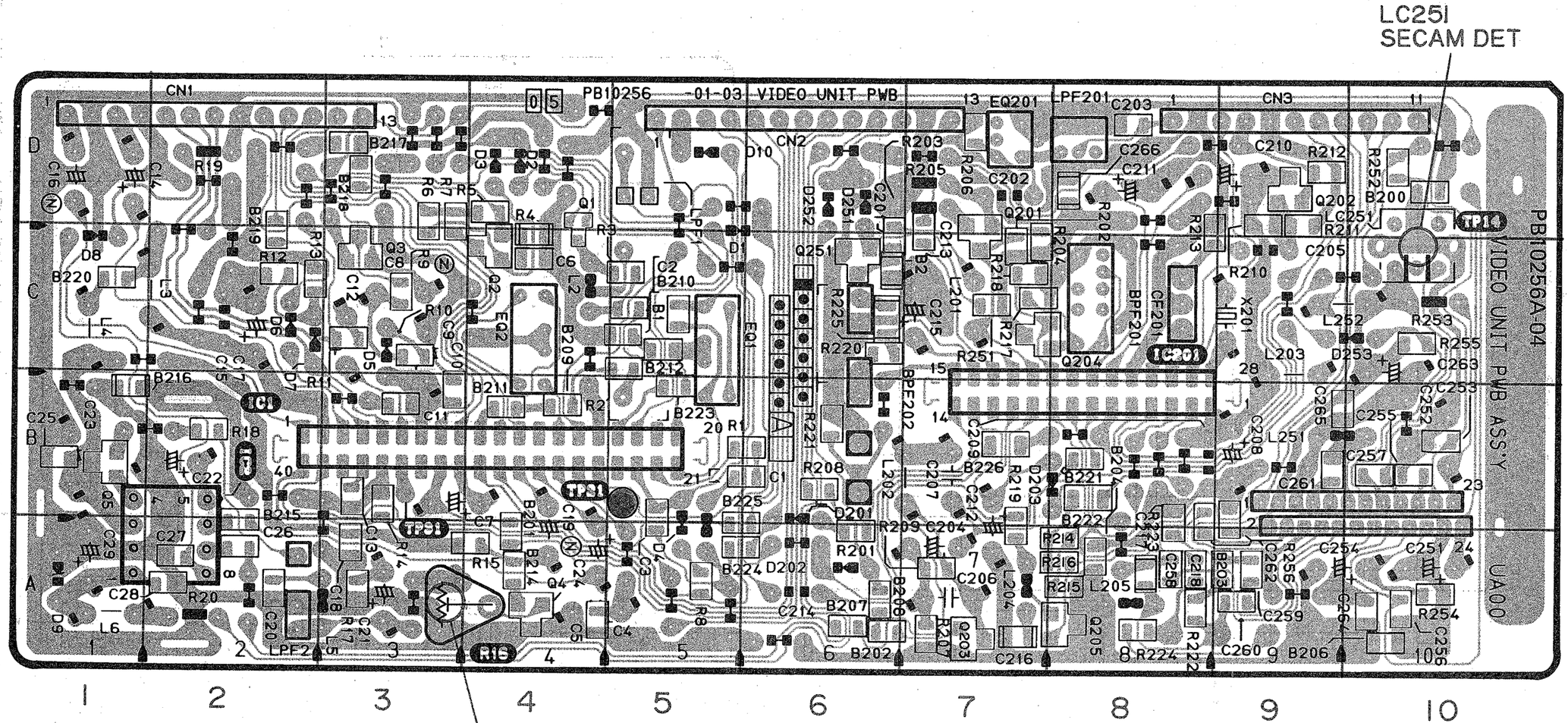
SP REC COLOR

SP FREQ

TP210 TP212 TP206 TP201

LPF2 LC251 SECAM DET

3.18 VIDEO UNIT CIRCUIT BOARD



Note: Double edging indicates not used in this model.
Examples; Resistor, Capacitor, Transistor, DIODE

3.19 IF & TNR CTL SCHEMATIC DIAGRAM

Note: Voltages are DC-measured with a digital voltmeter during stop and tuner mode.

● Address of chip parts
1D
└ Address

RF CONV & MIXER

Q2
2SD1863(QR)

IC2
CAT93C46P

Q7, Q8, Q9
UN4319V1

CN2
PWM
M CE
M DATA
GND
AUDIO MUTE
TNR CTL
AFC DEF
SYNC DET
M CLOCK
VHF L
VHF H
UHF

From/To 03 MAIN (MECHACON) CN604, CN605 (Page 3-25)

Q4
DTC144ES

Q3
2SB810H,J

TNR 1

Q5
2SC1740(S)

SW 12 V

UNSW 12 V

48 V

IC1
AN1358

08 TUNER CTL

CN1
48V
UNSW 12V
GND
VIDEO (TNR)
NC
GND
AUDIO (TNR)

To 03 MAIN (VIDEO) CN701 (Page 3-32)

JP1
SWD 12V
GND
NC
GND
VIDEO
GND
AUDIO
SYNC DET
AFC DEF
NC
MUTE
AFC
GND
IF
NC
AGC

07 IF

Q4
2SC1740S(RS)

Q11
2SC1740S(RS)

Q9
2SD1450S, T

R40
COLOR LEVEL

D5
SVC321SPA-B-1

SWD 12 V

Q7
2SC1740(RS)

Q6
2SA933S(RS)

Q5
2SC1740(RS)

IC1 M51365SP

LIM
SIF DET
FM DE.
IF AMP
VCO
PHASE DET
AFC
IF AGC
RF AGC
VIDEO DET
LOCK CTL
EQ
BNC

T2 VCO 38.9MHz
T4 SOUND DET 5.5MHz

SAW 1

R21
RF AGC

Q2
2SC3354

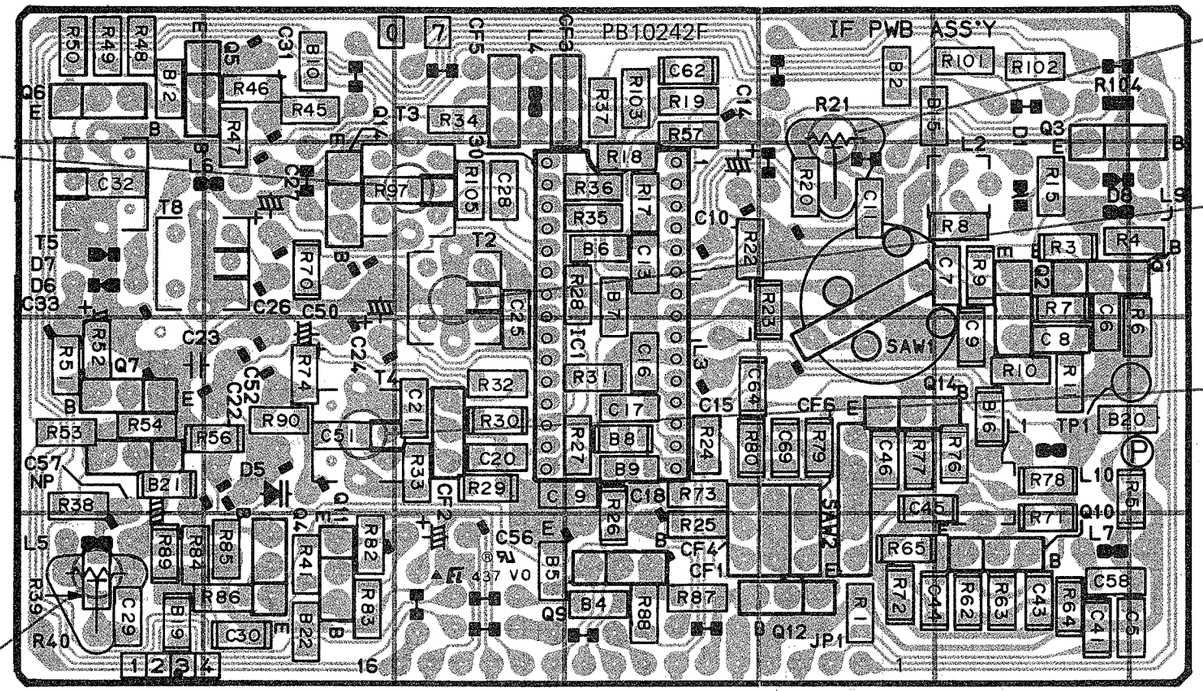
Q3
2SC1317(RS)

Q14
DTC144ES

T3 AFC 38.9MHz

3.20 IF & TNR CTL CIRCUIT BOARDS

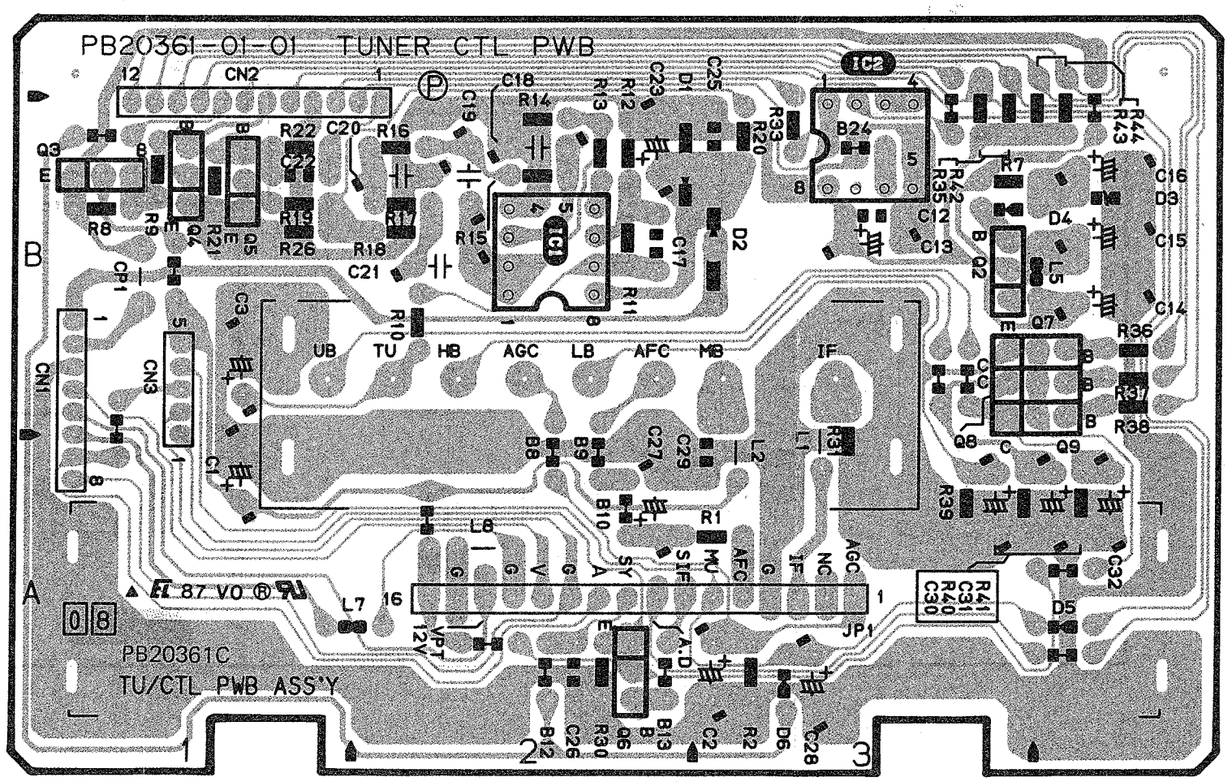
– IF –



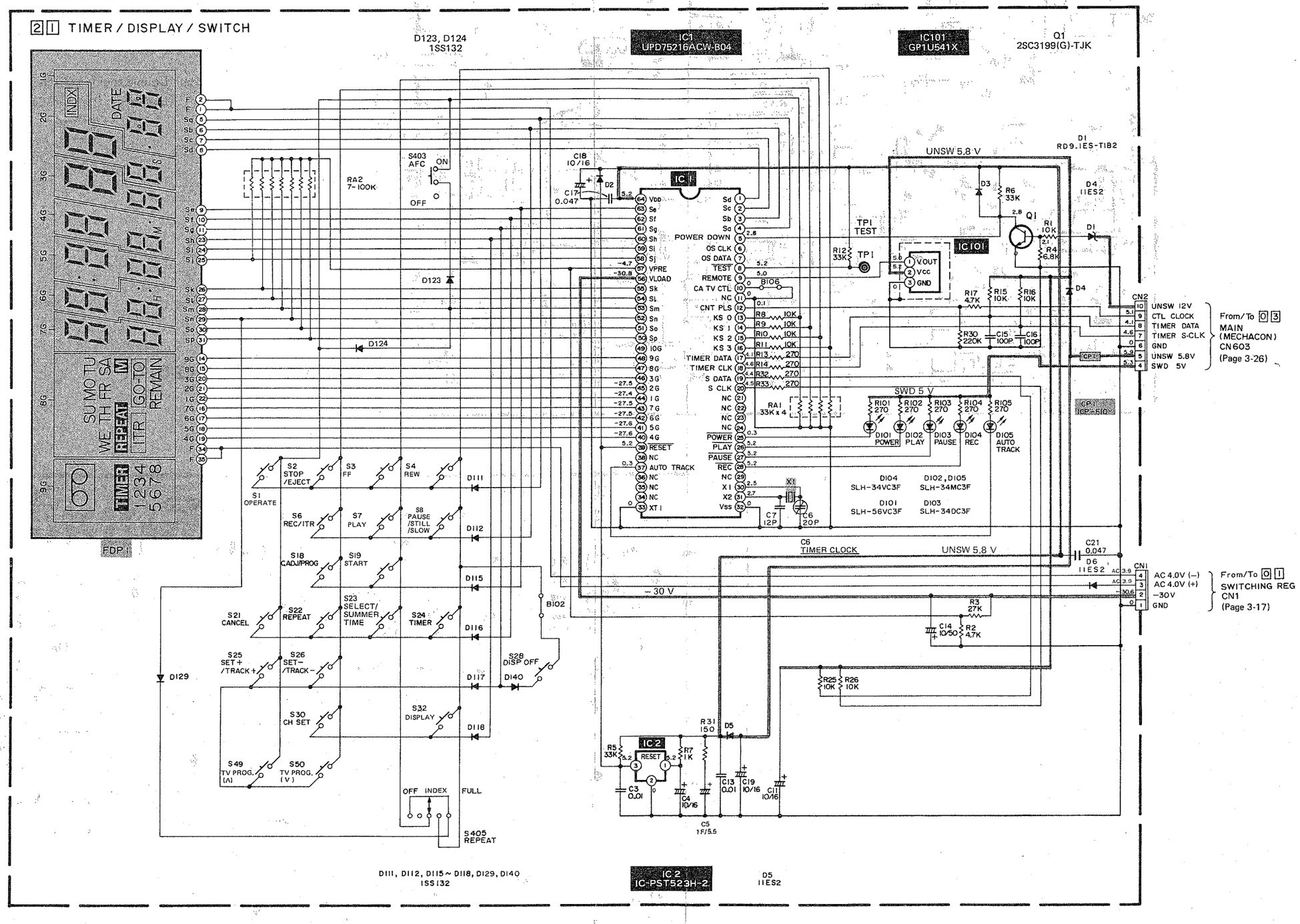
IF PWB PB10242-01-01

Note: Double edging indicates not used in this model.
Examples; Resistor, Capacitor, Transistor, DIODE

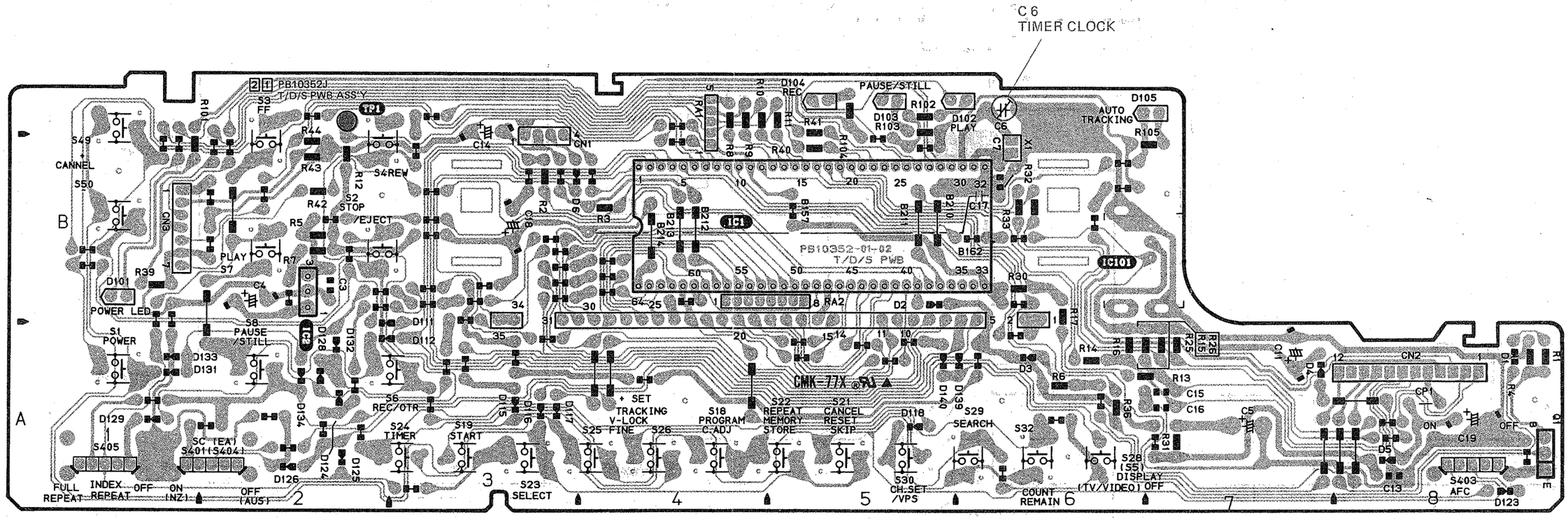
– TUNER CTL –



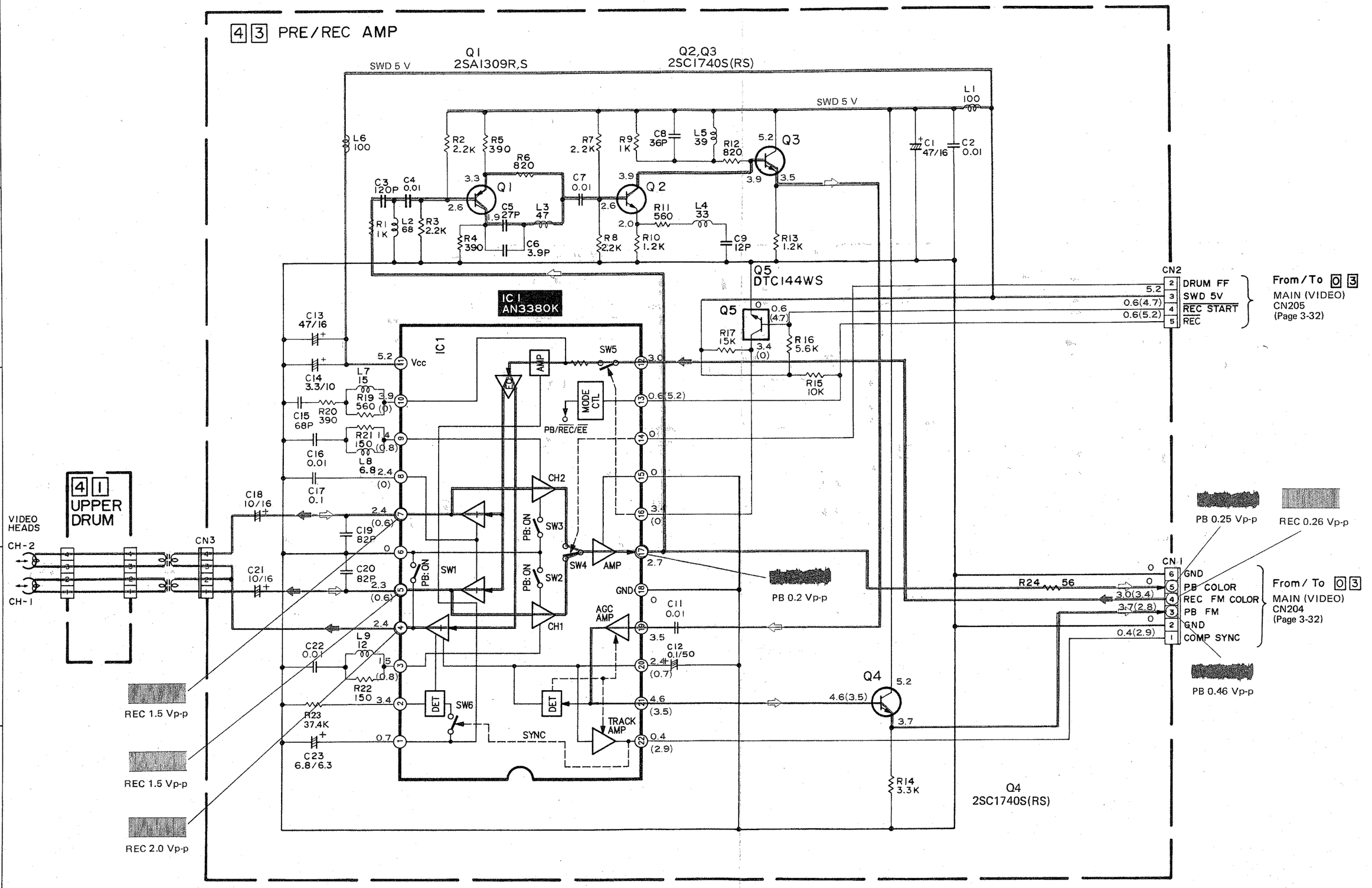
3.21 TIMER/DISP/SW SCHEMATIC DIAGRAM



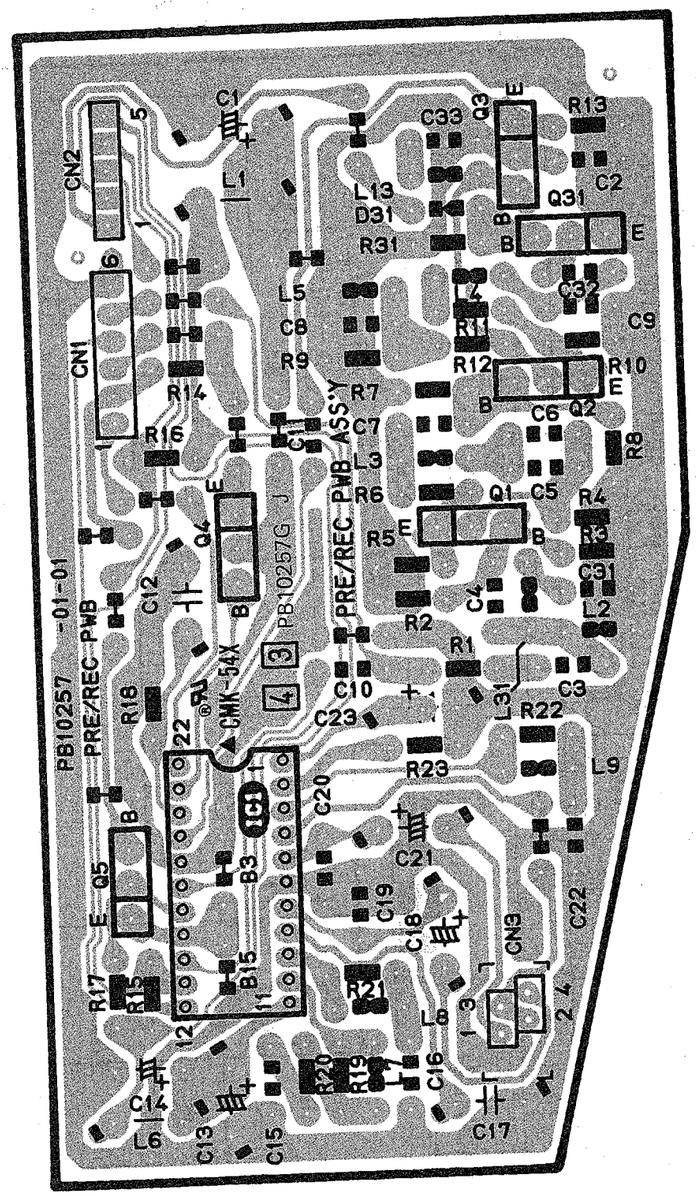
3.22 TIMER/DISP/SW CIRCUIT BOARD



3.23 PRE/REC SCHEMATIC DIAGRAM



3.24 PRE/REC CIRCUIT BOARD

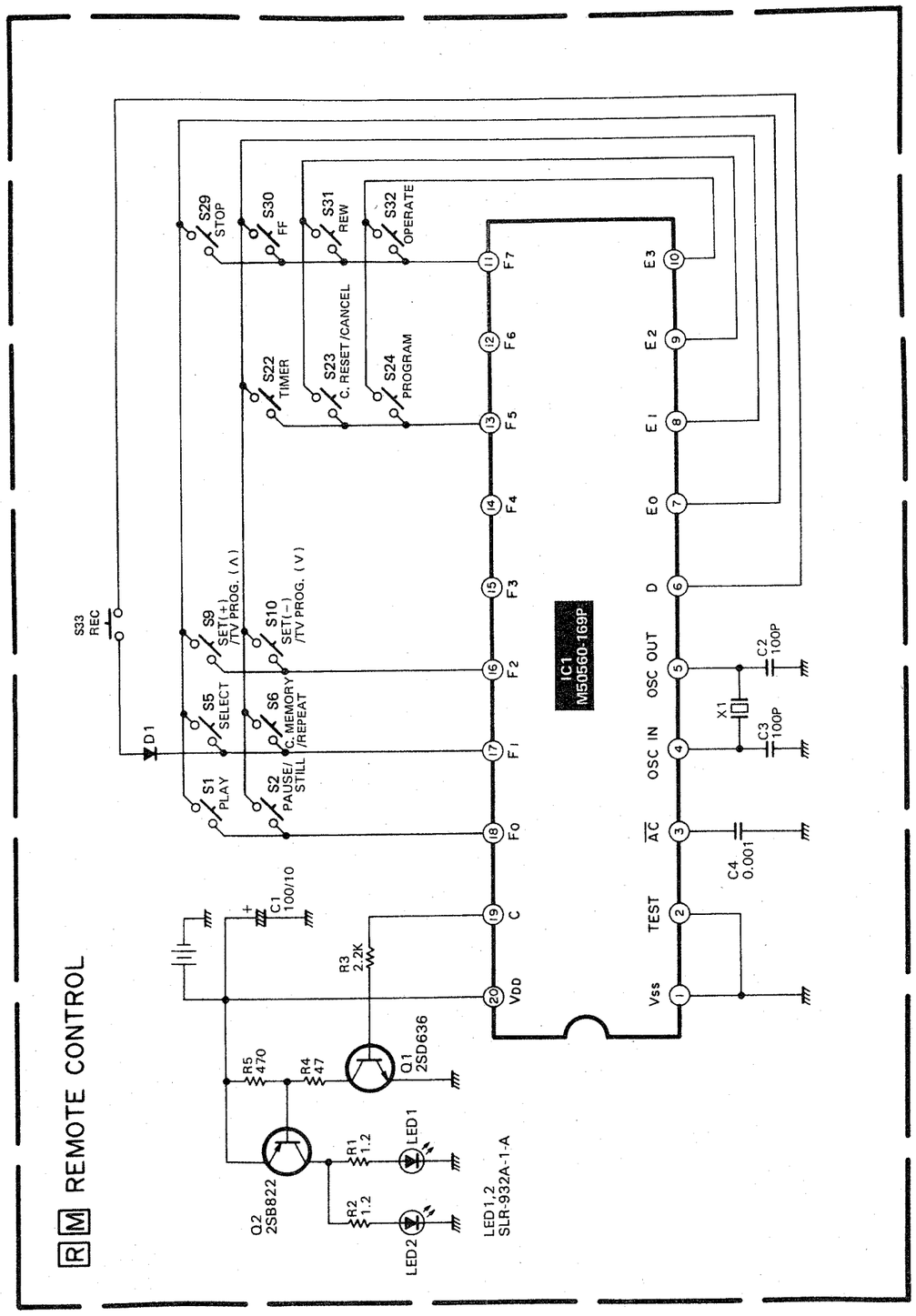


1 2 3 4 5 6

A B C 3-45 3-46 E F G H

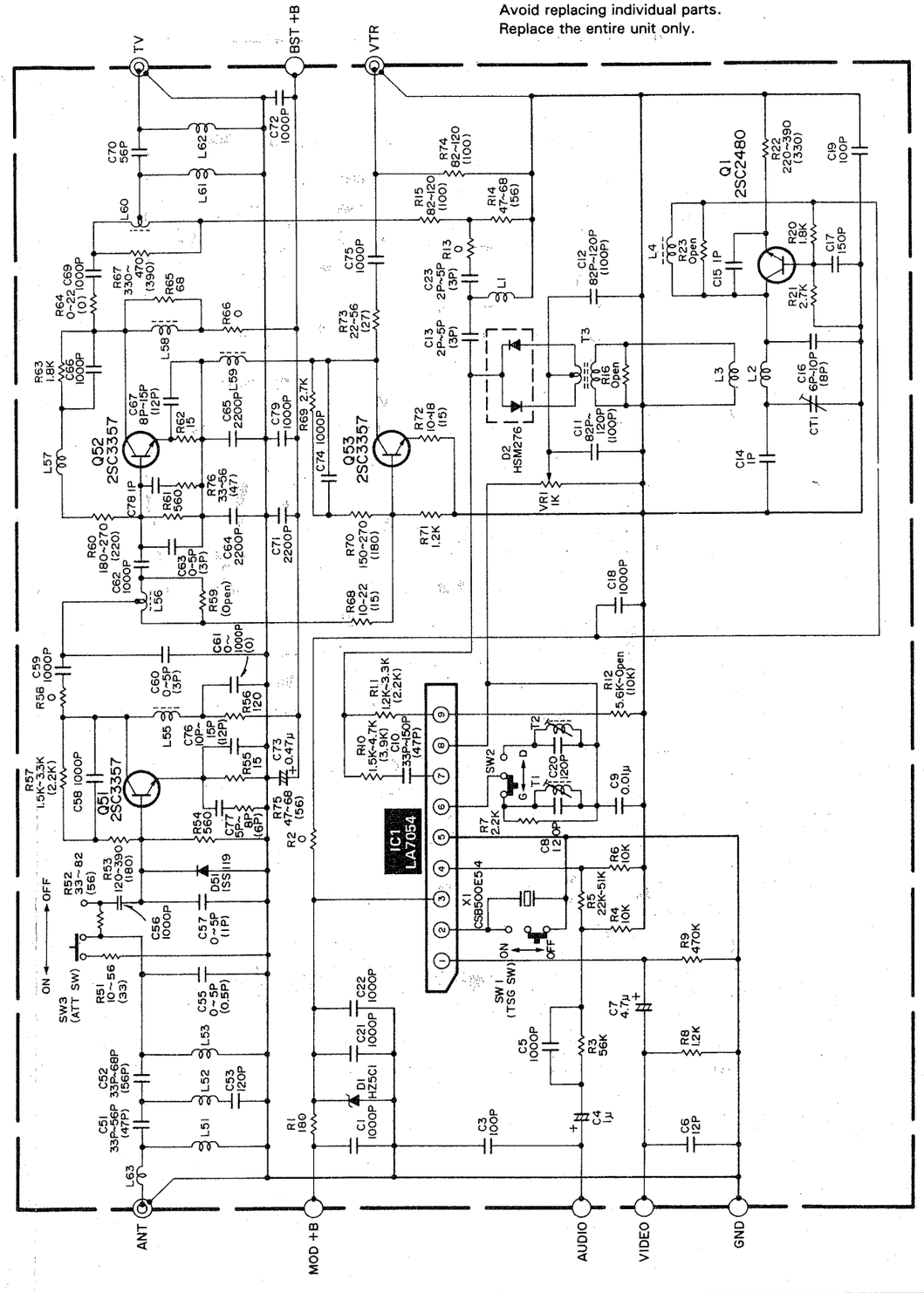
3.25 REMOTE CONTROL SCHEMATIC DIAGRAM

NOTES: 1. All parts shown in this schematic are critical for safety.
2. This schematic is only for reference.
Avoid replacing individual parts.
Replace the entrie unit only.



3.26 RF CONVERTER AND RF SWITCH SCHEMATIC DIAGRAM

NOTES:
1. All parts shown in this schematic are critical for safety.
2. This schematic is only for reference.
Avoid replacing individual parts.
Replace the entire unit only.



SECTION 4
EXPLODED VIEWS AND PARTS LIST

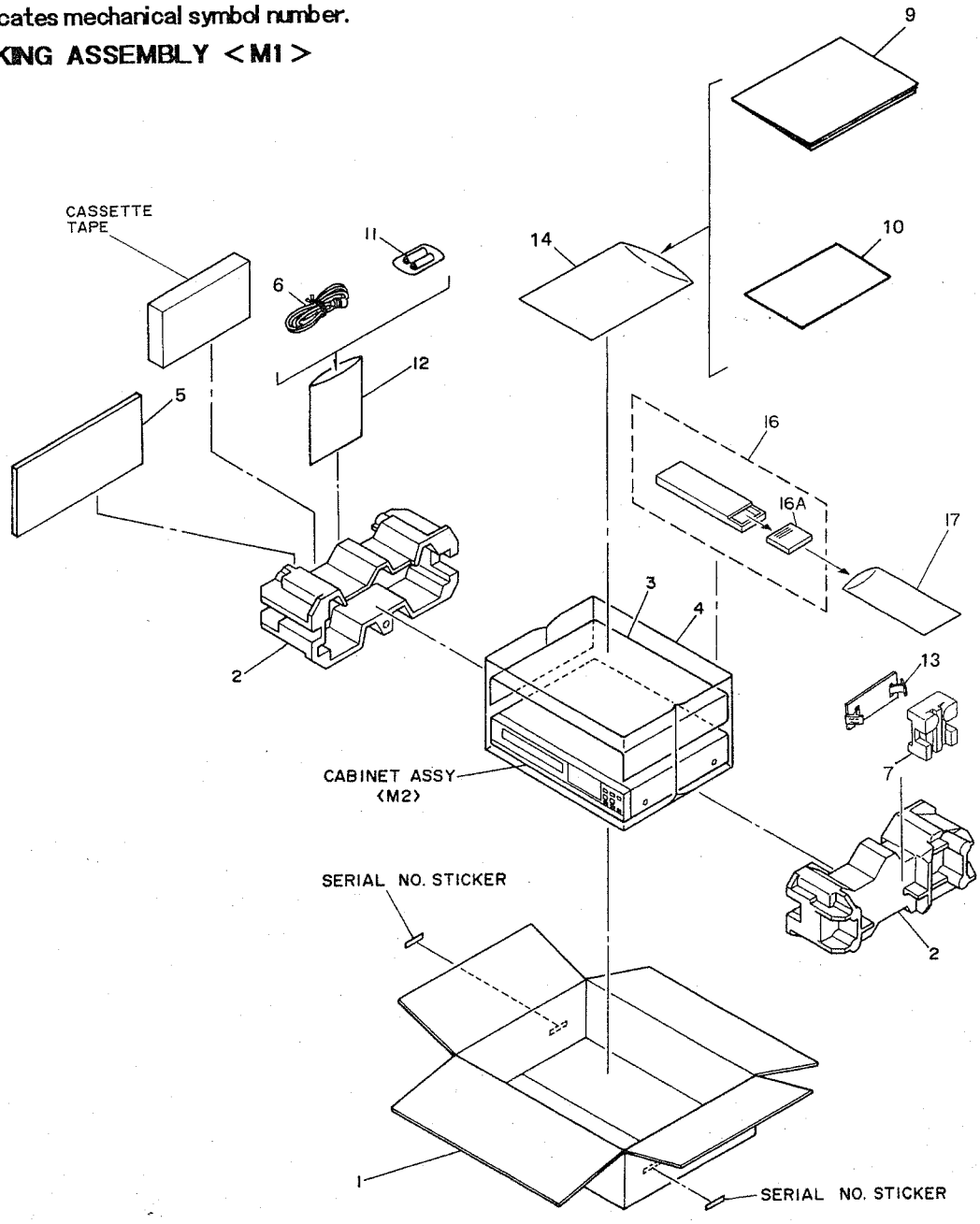
SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified parts numbers.

NOTE:

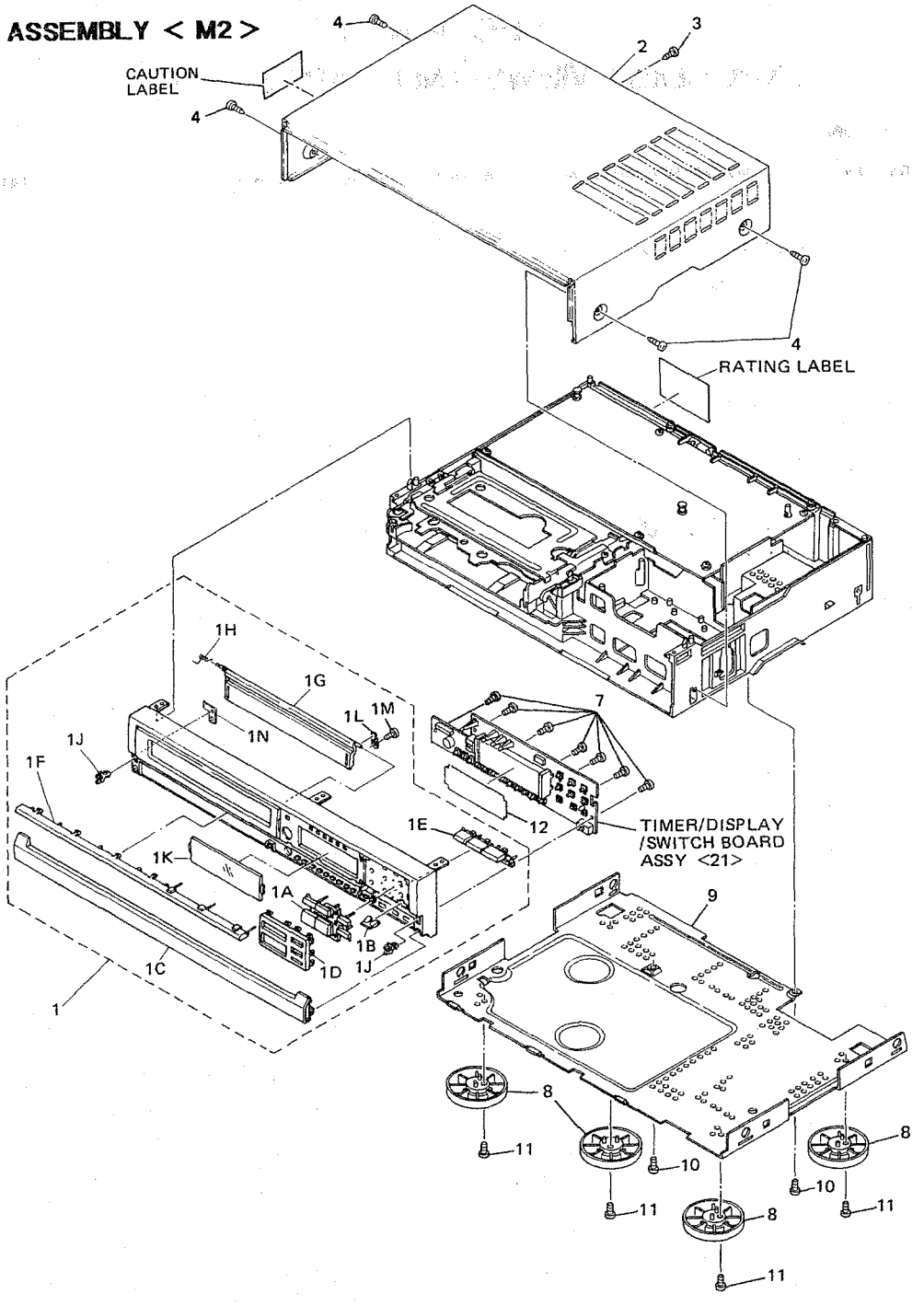
[M] indicates mechanical symbol number.

4.1 PACKING ASSEMBLY <M1>



#⚠	REF No.	PART No.	PART NAME, DESCRIPTION
			PACKING ASSEMBLY <M1>
	1	PQ33099-9-6	PACKING CASE
	2	PQ33275A-2	CUSHION ASSY
	3	PQ41026-20	PROTECT SHEET
	4	PQM30021-59-11	POLY BAG
	5	PQ42987-6	SHEET
	6	PU59168-3	RF CABLE
	or	PU59167-3	RF CABLE
	7	PQ33297	CUSHION
⚠	9	PU30425-1175	INSTRUCTIONS
	10	TCN-3379	TAPE CATALOG
	11	UM-3DJ2P	BATTERY, X2
	12	QPGA020-02005	POLY BAG
	13	PQ31424A	HANDLE ASS'Y
	14	QPGA025-03505	POLY BAG
⚠	16	PQ10344CG	REMOTE CONTROLLER
	16A	PQ31323	BATTERY CAP
	17	PQ33533	POLY BAG

4.2 CABINET ASSEMBLY < M2 >

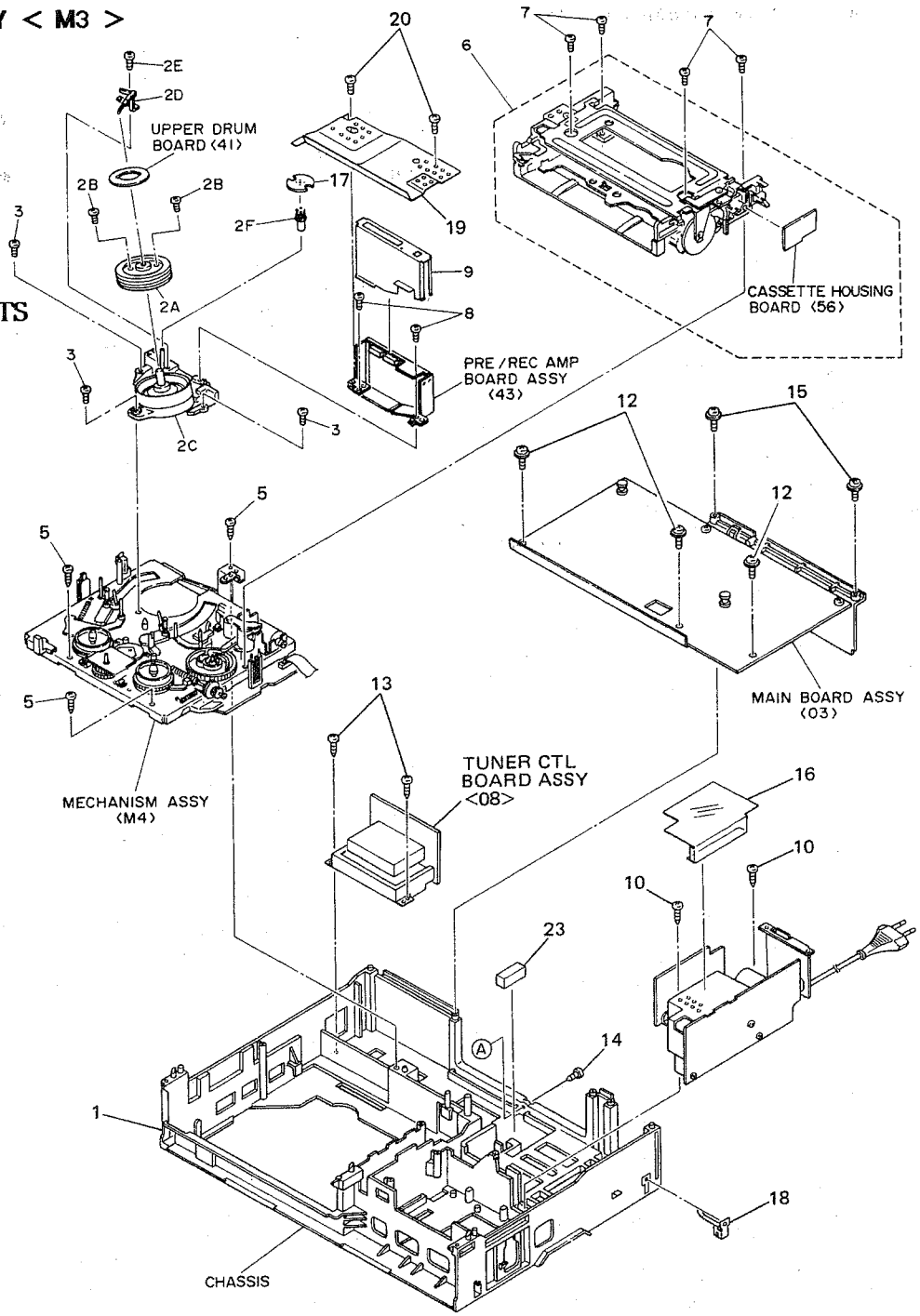


#⚠	REF No.	PART No.	PART NAME, DESCRIPTION
			CABINET ASSEMBLY < M2 >
⚠	1	PQ10889N	FRONT PANEL ASSY
	1A	PQ32990-3	BUTTON (OPE.)
	1B	PQ44062-1-2	INDICATOR
	1C	PQ20892N	DOOR ASSY
	1D	PQ32991-3	COVER (OPE.)
	1E	PQ32993-3	HINGE (OPE.)
	1F	PQ20888-2	COVER (1)
	1G	PQ20890-7	CASSETTE HOUSING DOOR
	1H	PQ43628-1-1	TORSION SPRING
	1J	PU60109	CATCHER, X2
	1K	PQ32992-3-3	DISPLAY WINDOW
	1L	PQ44389	BRACKET
	1M	SDSF2005Z	SCREW
	1N	PQ32994-1-2	EARTH PLATE
⚠	2	PQ10602-11	TOP COVER
	3	SDSF3010M	SCREW, FOR TOP COVER
	4	PQ43827	SPECIAL SCREW, X4 FOR TOP COVER
	7	SDSF2608Z	SCREW, X7 FOR T/D/S BOARD
	or	SPST2608Z	SCREW
	8	PQ43456B-1	FOOT ASSY, X4
⚠	9	PQ10712-1-5	BOTTOM COVER
	10	SDSF3012Z	SCREW, X2, FOR BOTTOM COVER
	11	SDSF3012Z	SCREW, X4 FOR FOOT
	12	PQ43850-2-5	FILTER (FDP)

4.3 CABINET ASSEMBLY < M3 >

BEWARE OF BOGUS PARTS

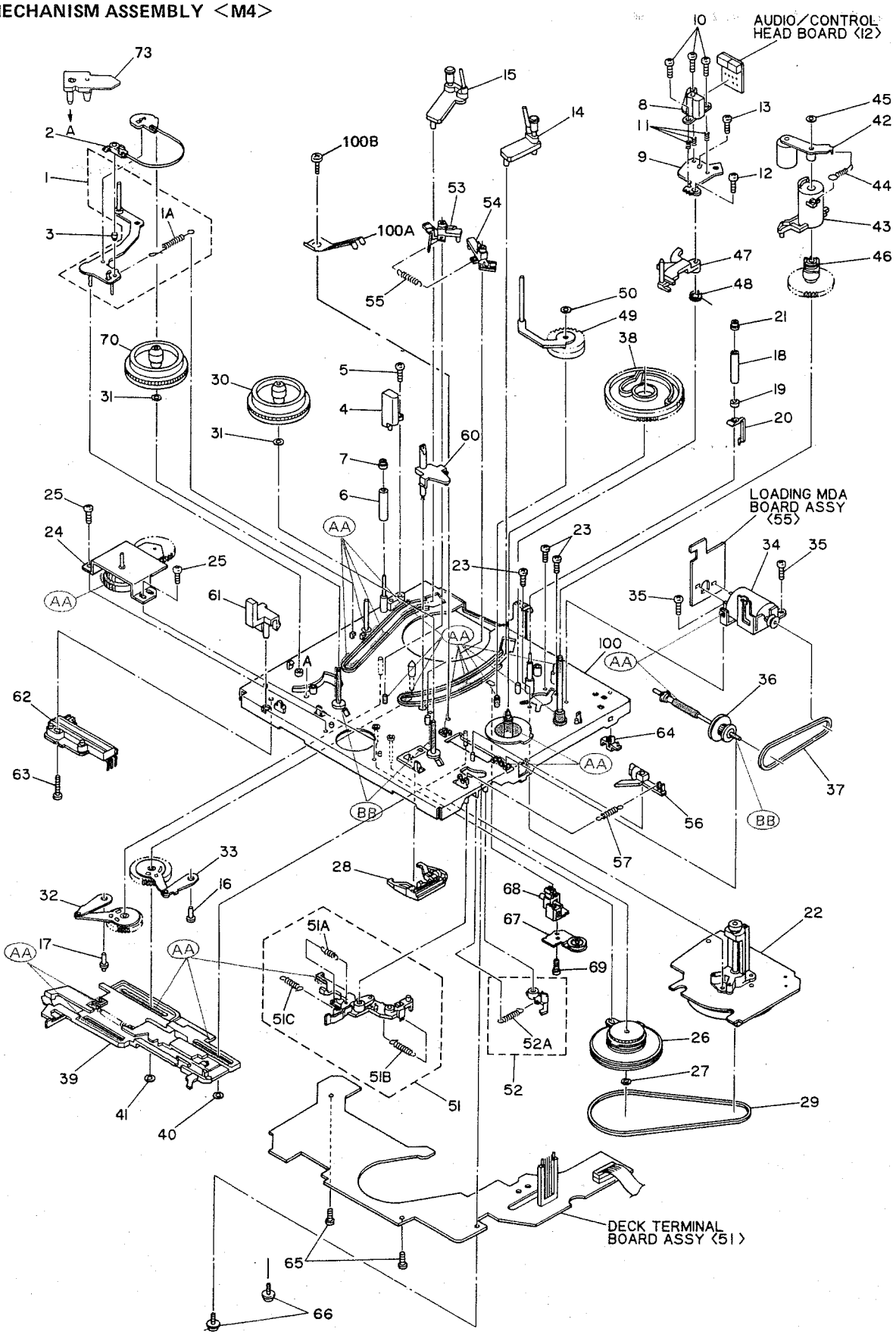
Parts that do not meet specifications may cause truble in regard to safety and performance. We recommend that genuine JVC parts be used.



CHASSIS ASSEMBLY < M3 >

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION
⚠	1	PQ10764-1-4	BOTTOM CHASSIS
	2A	PDM2008C-5	UPPER DRUM ASSEMBLY
	2B	PDM4165A	DRUM SCREW ASSEMBLY, X2
	2C	PDM2138G	LOWER DRUM MOTOR ASSEMBLY
	2D	PDM4229A-1	BRUSH ASSEMBLY
	2E	SPSG2606Z	SCREW, FOR BRUSH ASSEMBLY
	2F	PDM4226A	ROLLER ASSEMBLY
	3	SPST2610Z	SCREW, X3, FOR DRUM
	or	SDST2610Z	SCREW
	5	PQ43831	SPECIAL SCREW, X3, FOR MAIN DECK
	6	PUS29183B-7	CASSETTE HOUSING ASSY
	7	SDST2608Z	SCREW, X4, FOR CASSETTE HOUSING
	8	SDSG2606Z	SCREW, X2, FOR PRE/REC
	9	PQ32217-1-1	SHIELD CASE (2), FOR PRE/REC
	10	PQ43831	SPECIAL SCREW, X2, FOR P.TRANS
	12	GPSF2610Z	SCREW, X3, FOR MAIN BOARD
	13	SDSF3008Z	SCREW, X2, FOR TUNER UNIT
	14	SDSF3010M	SCREW, FOR TEARMINAL BOARD
	15	GPSF2610Z	SCREW, X2, FOR TEARMINAL BOARD
⚠	16	PQ44631	AC COVER
	17	PQ44230	INERTIA PLATE
⚠	18	PQ44679	EARTH PLATE
	19	PQ32387-1-4	DRUM SHIELD
	20	SDST2608Z	SCREW, X2, FOR DRUM SHIELD
	23	PQM30029-127	SPACER, FOR CHASSIS

4.4 MECHANISM ASSEMBLY <M4>



Category	Part number	MARK
Grease	KANTO-G-31KAV	(AA)
Oil	COSMO-HV56	(BB)

NOTE: The section marked in (AA) and (BB) indicate lubrication and greasing areas.

MECHANISM ASSEMBLY <M4>

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION
	1	PQ43497E-8	TENSION ARM ASSY
	1A	PQ43500	TENSION SPRING
	2	PQ43501B-11	TENSION BAND ASSY
	3	PQ43503-1-4	ADJUST PIN
	4	PU60616	FULL ERASE HEAD
	5	SDSF2614Z	SCREW
	6	PQ43505-1-1	ROLLER
	7	PQ43506	GUIDE POLE CAP
	8	PU60617	AUDIO/CONTROL HEAD
	9	PQ43509	HEAD BASE
	10	PQ43687A	SPECIAL SCREW, X3
	11	PQM30002-192	COMPRESSION SPRING, X3
	12	SPSP2606Z	SCREW
	13	SPSF2608M	SCREW
	14	PU61103-2	POLE BASE ASSY (TU)
	15	PU61151-3	POLE BASE ASSY (SUPPLY)
	16	PQ43524	STOPPER
	17	PQ43525	STOPPER 2
	18	PQ43526-1-3	TAPE GUIDE
	19	PQ43670-1-1	GUIDE FLANGE
	20	PQ43675	TAPE GUARD
	21	PQ43506	GUIDE POLE CAP
⚠	22	PU61003-1-2	CAPSTAN MOTOR
	23	SPSG2608Z	SCREW, X3
	24	PU61004-1-3	IDLER GEAR UNIT
	25	SPST2606Z	SCREW, X2
	26	PU61005-1-4	CLUTCH UNIT
	27	PQM30017-8	SLIT WASHER
	28	PQ43532A-1	CHANGE LEVER ASSY
	29	PU61006	TIMING BELT
	30	PU60858-1-4	REEL DISK (TAKE-UP)
	31	PQM30018-54	SPACER, X2
	32	PQ43537A	LOADING ARM ASSY (SUPPLY)
	33	PQ43542B	LOADING ARM ASSY (TAKE-UP)
⚠	34	PQ43676B-5	MODE MOTOR ASSY
	or	PQ43676C	MODE MOTOR ASSY
	35	SPST2606Z	SCREW, X2
	36	PQ43548A-3	WORM CLUTCH ASSY
	37	PQM30003-23	BELT (LOADING)
	38	PQ20822-2-4	CONTROL CAM
	39	PQ44326A-3	PLATE ASSY
	40	PQM30017-12	SLIT WASHER
	41	PQM30017-8	SLIT WASHER
	42	PQ43921B-2	PINCH ROLLER ARM ASSY
	or	PQ43921D-2	PINCH ROLLER ARM ASSY
	43	PQ32415	PINCH ROLLER PRESS LEVER
	44	PQM30001-233	TENSION SPRING
	45	PQM30017-12	SLIT WASHER
	46	PQ32416-2	PINCH ROLLER CAM
	47	PQ43567A-8	GUIDE ARM ASSY
	48	PQ43569-1-3	TORSION SPRING
	49	PQ43570A	HALF LOADING GEAR ASSY
	50	PQM30017-12	SLIT WASHER
	51	PQ43575A-5	CANCEL LEVER ASSY
	51A	PQM30001-273	TENSION SPRING
	51B	PQM30001-237	TENSION SPRING
	51C	PQM30001-274	TENSION SPRING
	52	PQ43578A-2	HOOK ASSY
	52A	PQM30001-238	TENSION SPRING
	53	PQ43581A-6	MAIN BRAKE ASSY (SUPPLY)
	54	PQ43582A-2	MAIN BRAKE ASSY (TAKE-UP)
	55	PQM30001-251	TENSION SPRING
	56	PQ43583A	SUB BRAKE ASSY (TAKE-UP)
	57	PQM30001-298	TENSION SPRING
	60	PU60621-1-2	LED HOLDER (INCL. LED: D1)
	61	PU60624-1-4	REC SAFETY SWITCH (S2)
	62	PU60973	SLIDE SWITCH (S3)
	63	SDSF2614Z	SCREW
	64	PQ32516	PWB HOLDER
	65	SDST2616Z	SCREW, X2
	66	GPSF2608Z	SCREW, X2
	67	PQ43912A-5	PULLEY ARM ASSY
	68	PQ32882	PULLEY BASE
	69	SDSF2608Z	SCREW
	70	PU60859-1-4	REEL DISK (SUPPLY)
	73	PQ44246	TENSION BRACKET 3
	100	PQ20650E-18	MAIN DECK ASSY
	or	PQ20753D	MAIN DECK ASSY
	100A	PQ43849	EARTH PLATE
	100B	SPST2604Z	SCREW

SECTION 5
ELECTRICAL PARTS LIST

SAFETY PRECAUTION
Parts identified by the ⚠ symbol are critical for safety. Replace only with specified parts numbers.

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION

1. POWER TRANS BOARD ASSY <01><02>

	PWBA	PB20439Q-01	POWER SUPPLY BOARD ASSEMBLY
⚠	POC1	QMP3980-200	POWER CORD
⚠	BKT1	PQ20971	TRANS BRACKET
⚠	HD1	QHS3771-108	STRAIN RELIEF
	SCW1	SDST3006Z	SCREW, X4
	SLD1	PQ33261-1-1	SHIELD CASE (1)
	SLD2	PQ33262	SHIELD CASE (2)

– SWITCH REGULATOR BOARD ASSY <01> –

	PWBA1	PB20439Q1-01	SW REGULATOR BOARD ASSEMBLY
	IC1	LM358N	IC
	or	LM358P	IC
	or	BA10358	IC
	Q1	2SC4517A-LF619	TRANSISTOR
	Q2	2SC3616(MLK)	TRANSISTOR
	Q3	2SC1740S	TRANSISTOR
	Q4	2SC1741S	TRANSISTOR
	Q5	2SB941P	TRANSISTOR
	D1	10E6-F2	DIODE
	D2	10E6-F2	DIODE
	D3	10E6-F2	DIODE
	D4	10E6-F2	DIODE
	D5	AU01	FR DIODE
	D6	AU01	FR DIODE
	D7	MTZ27BT-77	ZENER DIODE
	D8	AU01Z	FR DIODE
	or	ERA48-02	FR DIODE
	D9	RD13ES-T1B3	DIODE
	or	UZ13BSC	ZENER DIODE
	D10	1SS133	DIODE
	or	MA165	DIODE
	D11	RD18ES-T1B1	ZENER DIODE
	or	UZ18BSA	ZENER DIODE
	D12	AU01Z	FR DIODE
	or	ERA48-02	FR DIODE
	D14	AU01Z	FR DIODE
	or	ERA48-02	FR DIODE
	D15	11EFS2	FR DIODE
	D16	FML-12S	FR DIODE
	or	F6P20F	FR DIODE
	D17	FMB-24	BARRIER DIODE
	or	F5KQ40B	BARRIER DIODE
	D18	AU01Z	FR DIODE
	or	ERA48-02	FR DIODE
	D19	MTZ30AT-77	ZENER DIODE
	D20	RD8.2ES-T1B1	ZENER DIODE
	or	UZ8.2BSA	ZENER DIODE
	D21	AK04	DIODE
	D22	MTZV6.2A	ZENER DIODE
	D23	AK04	DIODE
	D30	UZ33BSD	ZENER DIODE
	or	MTZ33DT-77	ZENER DIODE
	or	RD33ES-T1B4	ZENER DIODE
	R1	QRZ0078-2R2	W. W. RESISTOR 2.2Ω
	R2	QRD161J-184	RESISTOR 180KΩ, 1/6W
	R3	QRD161J-184	RESISTOR 180KΩ, 1/6W
	R4	QRD161J-563	RESISTOR 56KΩ, 1/6W
	R5	QRG029J-683G	OMF RESISTOR 68KΩ, 2W
	R6	QRG029J-241G	OMF RESISTOR 240Ω, 2W
	R7	QRD161J-122	RESISTOR 1.2KΩ, 1/6W
	R8	QRD161J-471	RESISTOR 470Ω, 1/6W
	R9	QRX014J-R33	MF RESISTOR 0.33Ω, 1W
	R10	QRG029J-303A	OMF RESISTOR 30KΩ,2W
	R11	QRD161J-223	RESISTOR 22KΩ, 1/6W
	R12	QRD161J-472	RESISTOR 4.7KΩ, 1/6W
	R14	QRG029J-560G	RESISTOR 56Ω, 2W
	R15	QRD161J-334	RESISTOR 330KΩ, 1/6W
	R16	QRD161J-222	RESISTOR 2.2KΩ, 1/6W
	R17	QRD161J-221	RESISTOR 220Ω, 1/6W
	R18	QRD161J-102	RESISTOR 1.0KΩ, 1/6W
	R19	QRV144F-1051AY	CMF RESISTOR 1.05KΩ, 1/4W
	R20	QRV144F-1001A	CMF RESISTOR 1KΩ, 1/4W
⚠	R21	QRZ0077-470X	FUSIBLE RESISTOR 47Ω
	R22	QRD161J-333	RESISTOR 33KΩ, 1/6W
	R23	QRD161J-471	RESISTOR 470Ω, 1/6W
	R24	QRV144F-4023A	RESISTOR 4.0KΩ, 1/4W
	R25	QRV144F-1002A	CMF RESISTOR 10.0KΩ, 1/4W
	R26	QRV144F-1182A	CMF RESISTOR 11.8KΩ, 1/4W
	R28	QRD161J-331	RESISTOR 330Ω, 1/6W
	R29	QRD161J-103	RESISTOR 10KΩ, 1/6W
	R53	QRD161J-222	RESISTOR 2.2KΩ, 1/6W
⚠	C1	QFZ9022-333	MM CAPACITOR 0.033μF

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
⚠	C3	QFZ9022-333	MM CAPACITOR	0.033μF
⚠	C4	QCZ9016-102K	CAPACITOR	0.001μF
⚠	C5	QCZ9016-102K	CAPACITOR	0.001μF
⚠	C8	QCZ9016-102K	CAPACITOR	0.001μF
⚠	C9	QCZ9016-102K	CAPACITOR	0.001μF
⚠	C10	QCZ9016-222M	CAPACITOR	0.0022μF
⚠	C11	QCZ9016-222M	CAPACITOR	0.0022μF
	C12	QEZ0147-107	E CAPACITOR	100μF
	or	QEZ0111-107	E CAPACITOR	100μF
	C13	QCY53AK-472	CAPACITOR	0.0047μ, 1KV
	or	QCZ0212-472	CAPACITOR	0.0047μ, 1KV
	C14	QCZ0212-101	CAPACITOR	100PF, 1KV
	C15	QFV41HJ-474	TF CAPACITOR	0.47μF
	or	QFV11HJ-474	TF CAPACITOR	0.47μF
	C16	QFL41HJ-682	M CAPACITOR	0.0068μF,50V
	C17	QETC1HM-105	E CAPACITOR	1.0μF, 50V
	C18	QETC1JM-336	E CAPACITOR	33μF, 63V
	C19	QEZ0125-477	E CAPACITOR	470μF, 10V
	or	QEZ0138-477	E CAPACITOR	470μF, 10V
	C20	QETC1EM-337	E CAPACITOR	330μF, 25V
	C21	QEMB1CM-158	E CAPACITOR	1500μF, 16V
	C22	QETB1CM-108	E CAPACITOR	1000μF, 16V
	C23	QFL41HJ-102	M CAPACITOR	0.001μF, 50V
	C24	QEZ0136-228	E CAPACITOR	2200μF, 10V
	or	QEZ0106-228	E CAPACITOR	2200μF, 10V
	C25	QETC1HM-476	E CAPACITOR	47μF, 50V
	C26	QETC1VM-336	E CAPACITOR	33μF, 35V
	C27	QFL41HJ-103	M CAPACITOR	0.01μF, 50V
	C28	QEZ0156-127Z	E CAPACITOR	120μF
	or	QEZ0135-127Z	E CAPACITOR	120μF
	C29	QETC0JM-107	E CAPACITOR	100μF, 6.3V
	C30	QFL41HJ-103	M CAPACITOR	0.01μF, 50V
	C50	QCBB1HJ-271	CAPACITOR	270PF, 50V
	C54	QCBB1HJ-471	M CAPACITOR	470μF, 50
	C55	QFV11HJ-124	MMT CAPACITOR	0.12μF, 50V
	L1	PU60943-330K	COIL	33μH
	L2	PU60943-100M	COIL	10μH
	L3	PU60943-330K	COIL	33μH
	L4	PU48530-100K	COIL	10μH
⚠	PHC1	PC111S	PHOTO COUPLER	
⚠	T1	PELN0301	SWITCHING TRANS	
⚠	HD1	PU57505	FUSE CLIP, X2	
⚠	HS1	PQ44610-1-1	HEAT SINK, FOR Q1	
⚠	HS2	PQ44724	HEAT SINK, FOR D16, D17	
⚠	LF1	PU61108	LINE FILTER	
⚠	or	PU60347	LINE FILTER	
	SCW1	SDSG3008Z	SCREW	
⚠	SCW2	SDSG3006Z	SCREW	
	SCW3	SDSG3008Z	SCREW, X2, FOR D16, D17	
	SCW4	SDSG3006Z	SCREW, FOR HEAT SINK	
⚠	SLD1	PQ44698	INSULATOR	

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
⚠	TAB1	A74316	TAB, X2	
	CN1	PU58844-104	CAP HOUSING, PIN 4-7	
	CN2	PU58844-8	CAP HOUSING, PIN 2-9	
⚠	CP1	ICP-N5	CIRCUIT PROTECTOR	
⚠	CP2	ICP-N20	CIRCUIT PROTECTOR	
⚠	F1	QMF51E2-1R0	FUSE	T1.0A, AC250V
⚠	or	QMF51E2-1R0J1	FUSE	T1.0A, AC250V

- REGULATOR BOARD ASSEMBLY <02> -

	PWBA2	PB20439Q2-01	REGULATOR BOARD ASSEMBLY	
	Q7	2SB1425(EU)	TRANSISTOR	
	Q8	2SC1740S	TRANSISTOR	
	Q9	2SB941P	TRANSISTOR	
	Q10	2SC1740S(Q)	TRANSISTOR	
	Q11	2SC1740S	TRANSISTOR	
	Q12	2SA933S	TRANSISTOR	
	or	2SA1267(YG)-TJK	TRANSISTOR	
	D25	1SS133	DIODE	
	or	MA165	DIODE	
	D26	UZ5.1BSC	ZENER DIODE	
	or	MTZV5.1C	ZENER DIODE	
	or	RD5.1ES-T1B3	ZENER DIODE	
	R31	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
	R32	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R33	QRD161J-221	RESISTOR	220Ω, 1/6W
	R34	QRD161J-822	RESISTOR	8.2KΩ, 1/6W
	R35	QRD161J-471	RESISTOR	470Ω, 1/6W
	R36	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R37	QVZ3518-471A	V RESISTOR, DC 5V	470Ω
	or	QVZ3523-471A	V RESISTOR	470Ω
	R38	QRD161J-472	RESISTOR	4.7KΩ, 1/6W
	R39	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
	R40	QRD161J-103	RESISTOR	10KΩ, 1/6W
⚠	R41	QRZ0077-220X	FUSIBLE RESISTOR	22Ω
	R51	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
	R52	QRD161J-222	RESISTOR	2.2KΩ, 1/6W
	C34	QETC1JM-226	E CAPACITOR	22μF, 63V
	C35	QETC1CM-107	E CAPACITOR	100μF, 16V
	C36	QETC0JM-107	E CAPACITOR	100μF, 6.3V
	C37	QETC1CM-107	E CAPACITOR	100μF, 16V
	C38	QETC1AM-107	E CAPACITOR	100μF, 10V
	C39	QETB1AM-228	E CAPACITOR	2200μF, 10V
	C40	QFL41HJ-103	MY CAPACITOR	0.01μF, 50V
	C41	QETC0JM-107	E CAPACITOR	100μF, 6.3V
	C51	QETC1CM-476	E CAPACITOR	47μF, 16V
	TP1	PU54983	TEST PIN, X3, (TP1-TP3)	
	CN3	PU58844-108	CAP HOUSING, PIN 2-9	
	CN4	PU60910-111	CAP HOUSING	

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION
⚠	CP3	ICP-N20	CIRCUIT PROTECTOR
⚠	CP4	ICP-N38	CIRCUIT PROTECTOR
⚠	CP5	ICP-N38	CIRCUIT PROTECTOR

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2. MAIN BOARD ASSEMBLY <03>

	PWBA	PB10418D-01	MAIN BOARD ASSY
⚠	RF1	PU60384-1-1	RF CONVERTER/MIX BOOSTER
	SPC1	PU60010	SPACER, X2
⚠	TB1	PQ20776-28-9	TERMINAL BOARD
	BKT1	PQ32369	BRACKET
	CL1	PEME0767	WIRE HOLDER
	CL2	PU59311-3	WIRE CLAMP
	CL3	PU59311-2	WIRE CLAMP
	CL4	PU59311-4	WIRE CLAMP, X2
	ETH1	PQ43012-1-1	EARTH PLATE, FOR RF CONV.
	RV1	PU56800	NYLON RIVET
	SCW1	SDST2605Z	SCREW, RF CONV.
	SCW2	SDSF2608Z	SCREW, X2, FOR TERMINAL BOARD
	WR1	PW30401-BB20T	COAXIAL CORD, CONV.-TUN.
	or	PW30402-BB20M	COAXIAL CORD, CONV.-TUN.
	or	PW30401-BB20S	COAXIAL CORD, CONV.-TUN.
	J701	PEAS2023	CONNECTOR BOARD
	J702	PU60612	REMOTE PAUSE JACK
	or	PU61012	REMOTE PAUSE JACK
	TP31	PU57545	TEST PIN, X14

- AUDIO SECTION -

⚠	IC1	BA7765AS	IC
⚠	or	XRA7765AS	IC
	Q1	2SC1740S(RS)	TRANSISTOR
	or	2SC3199(G)-TJK	TRANSISTOR
	Q2	2SC1740S(RS)	TRANSISTOR
	or	2SC3199(G)-TJK	TRANSISTOR
	Q3	DTA114ES	TRANSISTOR
	Q4	2SC1740S(RS)	TRANSISTOR
	or	2SC3199(G)-TJK	TRANSISTOR
	Q5	DTA124ES	TRANSISTOR
	Q6	DTA144ES	TRANSISTOR

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	D2	1SS133	DIODE	
	or	MA165	DIODE	
	D3	RD5.1ES-T1B2	ZENER DIODE	
	or	UZ5.1BSB	ZENER DIODE	
	or	HZS5.1EB2	ZENER DIODE	
	R1	QRD161J-473	RESISTOR	47KΩ, 1/6W
	R4	QRD161J-242	RESISTOR	2.4KΩ, 1/6W
	R5	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R6	QRD161J-222	RESISTOR	2.2KΩ, 1/6W
	R7	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
	R8	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
	R9	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
	R10	QRD161J-100	RESISTOR	10Ω, 1/6W
	R11	QVZ3518-683AZ	V RESISTOR, BIAS ADJ	68KΩ
	or	QVZ3523-683AZ	V RESISTOR	68KΩ
	R12	QRD161J-153	RESISTOR	15KΩ, 1/6W
	R13	QRD161J-6R8	RESISTOR	6.8Ω, 1/6W
	R15	QRD161J-183	RESISTOR	18KΩ, 1/6W
	R16	QRD161J-181	RESISTOR	180Ω, 1/6W
	R17	QRD161J-274	RESISTOR	270KΩ, 1/6W
	R18	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R21	QRD161J-183	RESISTOR	18KΩ, 1/6W
	R22	QRD162J-682	RESISTOR	6.8KΩ, 1/6W
	R23	QRD162J-622	RESISTOR	6.2KΩ, 1/6W
	R24	QRD161J-153	RESISTOR	15KΩ, 1/6W
	R25	QRD161J-153	RESISTOR	15KΩ, 1/6W
	R26	QRD161J-475	RESISTOR	4.7MΩ, 1/6W
	R27	QRD161J-475	RESISTOR	4.7MΩ, 1/6W
	R28	QRD161J-123	RESISTOR	12KΩ, 1/6W
	R29	QRD161J-333	RESISTOR	33KΩ, 1/6W
	R30	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R32	QRD161J-333	RESISTOR	33KΩ, 1/6W
	R34	QRD161J-151	RESISTOR	150Ω, 1/6W
	R36	QRD161J-332	RESISTOR	3.3KΩ, 1/6W
	R37	QRD161J-273	RESISTOR	27KΩ, 1/6W
	R40	QRD161J-272	RESISTOR	2.7KΩ, 1/6W
	R41	QRD161J-475	RESISTOR	4.7MΩ, 1/6W
	R45	QRD161J-222	RESISTOR	2.2KΩ, 1/6W
	R46	QRD161J-472	RESISTOR	4.7KΩ, 1/6W
⚠	R47	QRZ0077-4R7X	FUSIBLE RESISTOR	4.7Ω
	R49	QRD161J-473	RESISTOR	47KΩ, 1/6W
	C1	QCBB1HJ-561	CAPACITOR	560PF, 50V
	C3	QCC11EJ-272	CAPACITOR	0.0027μF, 25V
	C4	QCC11EJ-392	CAPACITOR	0.0039μF, 25V
	C5	QETC1EM-475	E CAPACITOR	4.7μF, 25V
	C6	QFL31HJ-152	M CAPACITOR	0.0015μF, 50V
	C8	PU60550-105	E CAPACITOR	1μF
	C9	QETC1CM-106	E CAPACITOR	10μF, 16V
	C10	QFV71HJ-103	TF CAPACITOR	0.01μF, 50V
	C11	QEK61HM-105	E CAPACITOR	1.0μF, 50V
	C12	QETC1CM-106	E CAPACITOR	10μF, 16V
	C13	QEP61CM-106	NP E CAPACITOR	10μF, 16V
	or	QEN61CM-106	NP E CAPACITOR	10μF, 16V
	C14	QETC1CM-336	E CAPACITOR	33μF, 16V
	C15	QETC1HM-104	E CAPACITOR	0.1μF, 50V
	C16	QETC1HM-105	E CAPACITOR	1.0μF, 50V

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	C17	QFV71HJ-103	TF CAPACITOR	0.01μF, 50V
	C19	QETC1HM-335	E CAPACITOR	3.3μF, 50V
	C20	QCC11EJ-822	CAPACITOR	0.0082μF, 25V
	C21	QCC11EJ-152	CAPACITOR	0.0015μF, 25V
	C24	QCC11EJ-222	CAPACITOR	0.0022μF, 25V
	C26	QCBB1HJ-331	CAPACITOR	330PF, 50V
	C27	QFV71HJ-473	TF CAPACITOR	0.047μF, 50V
	L1	PU58308-103J	COIL	10mH
	L5	PU48530-471K	COIL	470μH
⚠	T1	PU60510-2	OSC TRANSFORMER	
	CN1	PU58844-4	CAP HOUSING	

– VIDEO SECTION –

Q201	DTC114WS	TRANSISTOR	
Q202	DTC144WS	TRANSISTOR	
Q203	2SA933S(RS)	TRANSISTOR	
or	2SA1267(YG)-TJK	TRANSISTOR	
Q204	2SC1740S(RS)	TRANSISTOR	
or	2SC3199(GB)-TJK	TRANSISTOR	
Q205	2SC1740S(RS)	TRANSISTOR	
or	2SC3199(GB)-TJK	TRANSISTOR	
Q206	2SC1740S(RS)	TRANSISTOR	
or	2SC3199(GB)-TJK	TRANSISTOR	
Q207	2SA933S(RS)	TRANSISTOR	
or	2SA1267(YG)-TJK	TRANSISTOR	
Q208	2SA933S(RS)	TRANSISTOR	
or	2SA1267(YG)-TJK	TRANSISTOR	
Q209	DTA114ES	TRANSISTOR	
Q210	2SA854S(QR)	TRANSISTOR	
D201	1SS133	DIODE	
or	MA165	DIODE	
D202	1SS133	DIODE	
OR	MA165	DIODE	
D204	1SS133	DIODE	
or	MA165	DIODE	
D205	1SS133	DIODE	
or	MA165	DIODE	
D206	1SS133	DIODE	
or	MA165	DIODE	
D207	1SS133	DIODE	
or	MA165	DIODE	
D208	1SS133	DIODE	
or	MA165	DIODE	
D209	1SS133	DIODE	
or	MA165	DIODE	
D210	1SS133	DIODE	
or	MA165	DIODE	
R201	QRD161J-472	RESISTOR	4.7KΩ, 1/6W
R202	QRD161J-563	RESISTOR	56KΩ, 1/6W
R204	QRD161J-182	RESISTOR	1.8KΩ, 1/6W
R205	QRD161J-472	RESISTOR	4.7KΩ, 1/6W
R206	QRD161J-562	RESISTOR	5.6KΩ, 1/6W
R207	QRD161J-222	RESISTOR	2.2KΩ, 1/6W

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	R208	QRD161J-182	RESISTOR	1.8KΩ, 1/6W
	R209	QRD161J-222	RESISTOR	2.2KΩ, 1/6W
	R210	QRD161J-222	RESISTOR	2.2KΩ, 1/6W
	R211	QRD161J-182	RESISTOR	1.8KΩ, 1/6W
	R212	QRD161J-152	RESISTOR	1.5KΩ, 1/6W
	R213	QRD161J-152	RESISTOR	1.5KΩ, 1/6W
	R214	QRD161J-331	RESISTOR	330Ω, 1/6W
	R215	QRD161J-681	RESISTOR	680Ω, 1/6W
	R216	QRD161J-331	RESISTOR	330Ω, 1/6W
	R217	QRD161J-222	RESISTOR	2.2KΩ, 1/6W
	R218	QRD161J-153	RESISTOR	15KΩ, 1/6W
	R219	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R220	QVZ3518-681AZ	V RESISTOR, SP REC COLOR	680Ω
	or	QVZ3523-681AZ	V RESISTOR	680Ω
	R221	QRD161J-222	RESISTOR	2.2KΩ, 1/6W
	R222	QRD161J-333	RESISTOR	33KΩ, 1/6W
	R223	QRD161J-153	RESISTOR	15KΩ, 1/6W
	R224	QRD161J-152	RESISTOR	1.5KΩ, 1/6W
	R225	QRD161J-561	RESISTOR	560Ω, 1/6W
	R226	QVZ3518-332AZ	V RESISTOR, SP FREQ	3.3KΩ
	or	QVZ3523-332AZ	V RESISTOR	3.3KΩ
	R227	QRD161J-101	RESISTOR	100Ω, 1/6W
	R228	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
	R229	QRD161J-123	RESISTOR	12KΩ, 1/6W
	R230	QRD162J-103	RESISTOR	10KΩ, 1/6W
	R231	QRD123J-391SX	RESISTOR	390Ω, 1/2W
	R232	QRD161J-472	RESISTOR	4.7KΩ, 1/6W
	R233	QRD161J-682	RESISTOR	6.8KΩ, 1/6W
	R234	QRD161J-101	RESISTOR	100Ω, 1/6W
	R235	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
	R236	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
	R237	QRD161J-222	RESISTOR	2.2KΩ, 1/6W
	R238	QRD161J-750	RESISTOR	75Ω, 1/6W
	R239	QRD161J-750	RESISTOR	75Ω, 1/6W
	R240	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
	R243	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R244	QRD161J-682	RESISTOR	6.8KΩ, 1/6W
	R250	QRD161J-471	RESISTOR	470Ω, 1/6W
	C201	QEN61AM-226	NP E CAPACITOR	22μF, 10V
	or	QENC1AM-226	NP E CAPACITOR	22μF, 10V
	C202	QCVB1CN-103	CAPACITOR	0.01μF, 16V
	C203	QCVB1CN-103	CAPACITOR	0.01μF, 16V
	C204	QCVB1CN-103	CAPACITOR	0.01μF, 16V
	C205	QCBB1HJ-121	CAPACITOR	120PF, 50V
	C206	QCBB1HJ-121	CAPACITOR	120PF, 50V
	C207	QCVB1CN-103	CAPACITOR	0.01μF, 16V
	C208	QCVB1CN-103	CAPACITOR	0.01μF, 16V
	C209	QETC1CM-476	E CAPACITOR	47μF, 16V
	C210	QCVB1CN-103	CAPACITOR	0.01μF, 16V
	C211	QCVB1CN-103	CAPACITOR	0.01μF, 16V
	C212	QETC0JM-476	E CAPACITOR	47μF, 6.3V
	C213	QCVB1CN-103	CAPACITOR	0.01μF, 16V
	C214	QCVB1CN-103	CAPACITOR	0.01μF, 16V
	C215	QCSB1HJ-330	CAPACITOR	33PF, 50V
	C216	QETC1CM-476	E CAPACITOR	47μF, 16V
	C217	QCVB1CN-103	CAPACITOR	0.01μF, 16V

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	C218	QETC0JM-477	E CAPACITOR	470μF, 6.3V
	C219	QETC0JM-476	E CAPACITOR	47μF, 6.3V
	C220	QCC31CJ-473	CAPACITOR	0.047μF, 16V
	C221	QETC1HM-474	E CAPACITOR	0.47μF, 50V
	C222	QETC1HM-105	E CAPACITOR	1.0μF, 50V
	C224	QCBB1HJ-102	CAPACITOR	0.001μF, 50V
	C225	QCFB1EZ-223	CAPACITOR	2.2μF, 25V
	C240	QCC31CJ-333	CAPACITOR	3.3μF, 16V
	C241	QETC1CM-336	E CAPACITOR	33μF, 16V
	C260	QCBC1HJ-101	CAPACITOR	100PF, 50V
	L201	PU59152-221J	COIL	220μH
	L202	PU59152-560J	COIL	56μH
	L203	PU48530-101K	COIL	100μH
	L204	PU48530-101K	COIL	100μH
	L205	PU59152-220J	COIL	22μH
	L206	PU48530-101K	COIL	100μH
	L207	PU54710-222	COIL	2.2mH
	L208	PU59152-R22J	COIL	0.22μH
	CN204	PU58844-6	CAP HOUSING	
	CN205	PU59555-4	CAP HOUSING	

– SERVO SECTION –

IC401	HD49733NT	IC	
or	HD49733ANT	IC	
IC501	BA7039	IC	
or	XRA7039	IC	
Q402	2SA1309(QRS)	TRANSISTOR	
or	2SA933S(QRS)	TRANSISTOR	
or	2SA1267(YG)-TJK	TRANSISTOR	
D401	1SS133	DIODE	
or	MA165	DIODE	
D402	1SS133	DIODE	
or	MA165	DIODE	
D403	1SS133	DIODE	
or	MA165	DIODE	
D404	1SS133	DIODE	
or	MA165	DIODE	
D407	1SS133	DIODE	
or	MA165	DIODE	
D408	1SS133	DIODE	
or	MA165	DIODE	
D409	1SS133	DIODE	
or	MA165	DIODE	
D410	1SS133	DIODE	
or	MA165	DIODE	
R401	QRD161J-223	RESISTOR	22KΩ, 1/6W
R402	QRD161J-225	RESISTOR	2.2MΩ, 1/6W
R403	QRD161J-683	RESISTOR	68KΩ, 1/6W
R404	QRD161J-222	RESISTOR	2.2KΩ, 1/6W
R405	QRD161J-123	RESISTOR	12KΩ, 1/6W
R406	QRD161J-472	RESISTOR	4.7KΩ, 1/6W
R407	QRD161J-392	RESISTOR	3.9KΩ, 1/6W

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	R408	QRD161J-105	RESISTOR	1.0MΩ, 1/6W
	R409	QRD161J-273	RESISTOR	27KΩ, 1/6W
	R411	QRD161J-105	RESISTOR	1.0MΩ, 1/6W
	R412	QRD161J-273	RESISTOR	27KΩ, 1/6W
	R413	QRD161J-273	RESISTOR	27KΩ, 1/6W
	R414	QRD161J-335	RESISTOR	3.3MΩ, 1/6W
	R415	QRD161J-334	RESISTOR	330KΩ, 1/6W
	R416	QRD161J-822	RESISTOR	8.2KΩ, 1/6W
	R418	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
	R419	QRD161J-473	RESISTOR	47KΩ, 1/6W
	R420	QVZ3518-684	V RESISTOR, SP SW POINT	680KΩ
	R422	QRD161J-104	RESISTOR	100KΩ, 1/6W
	R426	QRD161J-821	RESISTOR	820Ω, 1/6W
	R427	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
	R428	QRD161J-105	RESISTOR	1.0MΩ, 1/6W
	R429	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
	R430	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
	R434	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
	R435	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
	R436	QRD161J-274	RESISTOR	270KΩ, 1/6W
	R437	QRD161J-274	RESISTOR	270KΩ, 1/6W
	R438	QRD161J-224	RESISTOR	220KΩ, 1/6W
	R439	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R440	QRD161J-474	RESISTOR	470KΩ, 1/6W
	R441	QRD161J-823	RESISTOR	82KΩ, 1/6W
	R501	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
	R502	QRD161J-332	RESISTOR	3.3KΩ, 1/6W
	R503	QRD161J-272	RESISTOR	2.7KΩ, 1/6W
	R508	QRD161J-124	RESISTOR	120KΩ, 1/6W
	C401	QCVB1CM-103	CAPACITOR	0.01μF, 16V
	C402	QEK61AM-226	E CAPACITOR	22μF, 10V
	C403	QFV11HJ-224	TF CAPACITOR	0.22μF, 50V
	C404	QCC31CK-682	CAPACITOR	0.0068μF, 16V
	C405	QEK61EM-475	E CAPACITOR	4.7μF, 25V
	C406	QEK61EM-475	E CAPACITOR	4.7μF, 25V
	C407	QEK61CM-106	E CAPACITOR	10μF, 16V
	C408	QEK61CM-106	E CAPACITOR	10μF, 16V
	C409	QCC31CK-223	CAPACITOR	0.022μF, 16V
	C410	QFV71HJ-184	TF CAPACITOR	0.18μF, 50V
	or	QFV11HJ-184	MMT CAP	0.18μF, 50V
	C411	QCBB1HJ-471	CAPACITOR	470PF, 50V
	C412	QFL31HJ-682	M CAPACITOR	0.0068μF, 50V
	or	QFN31HJ-682	M CAPACITOR	0.0068μF, 50V
	C414	QCBB1HJ-102	CAPACITOR	0.001μF, 50V
	C415	QEK61AM-226	E CAPACITOR	22μF, 10V
	C416	QEK61AM-226	E CAPACITOR	22μF, 10V
	C417	QCBB1HJ-271	CAPACITOR	270PF, 50V
	C418	QCBB1HJ-561	CAPACITOR	560PF, 50V
	C419	QCBB1HJ-102	CAPACITOR	0.001μF, 50V
	C420	QEK61HM-105	E CAPACITOR	1.0μF, 50V
	C421	QCBB1HJ-102	CAPACITOR	0.001μF, 50V
	C422	QFV71HJ-563	TF CAPACITOR	0.056μF, 50V
	or	QFV11HJ-563	MMT CAP	0.056μF, 50V
	C423	QCBB1HJ-102	CAPACITOR	0.001μF, 50V
	C427	QCBB1HJ-181	CAPACITOR	180PF, 50V
	C502	QCVB1CM-103	CAPACITOR	0.01μF, 16V

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	C504	QFV71HJ-104	TF CAPACITOR	0.1μF, 50V
	or	QFV11HJ-104	MM CAPACITOR	0.1μF, 50V
	C505	QCVB1CM-103	CAPACITOR	0.01μF, 16V
	C506	QFV71HJ-683	TF CAPACITOR	0.068μF, 50V
	or	QFV11HJ-683	MMT CAP	0.068μF, 50V
	C507	QCVB1CM-103	CAPACITOR	0.01μF, 16V
	C508	QEK61AM-226	E CAPACITOR	22μF, 10V
	C509	QCVB1CM-103	CAPACITOR	0.01μF, 16V
	L501	PU59152-270J	COIL	27μH
	CN401	PU59555-4	CAP HOUSING	
	CN402	PU58844-3	CAP HOUSING	
⚠	CP401	CP-F15	CIRCUIT PROTECTOR	

- MECHACON SECTION -

IC601	M37418M6-364SP	IC	
IC603	M50253P	IC	
Q602	DTC114ES	TRANSISTOR	
Q603	2SB1425(EU)	TRANSISTOR	
D601	HZS7.5EB2	ZENER DIODE	
or	MTZ7.5B	ZENER DIODE	
or	UZ7.5BSB	ZENER DIODE	
D602	MA165	DIODE	
or	1SS133	DIODE	
D603	MA165	DIODE	
or	1SS133	DIODE	
D604	MA165	DIODE	
or	1SS133	DIODE	
D605	MA165	DIODE	
or	1SS133	DIODE	
D606	11ES2	DIODE	
or	ERA15-02	DIODE	
or	S5688G	DIODE	
or	1SR139-200	DIODE	
R601	QRD161J-332	RESISTOR	3.3KΩ, 1/6W
R602	QRD161J-332	RESISTOR	3.3KΩ, 1/6W
R603	QRD161J-103	RESISTOR	10KΩ, 1/6W
R604	QRD161J-472	RESISTOR	4.7KΩ, 1/6W
R605	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
R606	QRD161J-472	RESISTOR	4.7KΩ, 1/6W
R607	QRD161J-472	RESISTOR	4.7KΩ, 1/6W
R608	QRD161J-472	RESISTOR	4.7KΩ, 1/6W
R609	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
R610	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
R611	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
R612	QRD161J-472	RESISTOR	4.7KΩ, 1/6W
R613	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
R614	QRD161J-103	RESISTOR	10KΩ, 1/6W
R615	QRD161J-472	RESISTOR	4.7KΩ, 1/6W
R616	QRD161J-103	RESISTOR	10KΩ, 1/6W
R617	QRD161J-472	RESISTOR	4.7KΩ, 1/6W
R618	QRD161J-472	RESISTOR	4.7KΩ, 1/6W
R619	QRD161J-472	RESISTOR	4.7KΩ, 1/6W

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	R620	QRD161J-472	RESISTOR	4.7KΩ, 1/6W
	R621	QRD161J-472	RESISTOR	4.7KΩ, 1/6W
	R622	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
	R623	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
	R624	QRD161J-105	RESISTOR	1.0MΩ, 1/6W
	R625	QRD161J-472	RESISTOR	4.7KΩ, 1/6W
	R626	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R627	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R628	QRD161J-822	RESISTOR	8.2KΩ, 1/6W
	R629	QRD161J-471	RESISTOR	470Ω, 1/6W
	R630	QRD161J-333	RESISTOR	33KΩ, 1/6W
	R631	QRD161J-563	RESISTOR	56KΩ, 1/6W
	R632	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R633	QRD161J-303	RESISTOR	30KΩ, 1/6W
	R634	QRD161J-154	RESISTOR	150KΩ, 1/6W
	R635	QRD161J-333	RESISTOR	33KΩ, 1/6W
	R636	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R637	QRD161J-224	RESISTOR	220KΩ, 1/6W
	R638	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R639	QRD161J-472	RESISTOR	4.7KΩ, 1/6W
	R641	QRD161J-152	RESISTOR	1.5KΩ, 1/6W
	R642	QRD161J-472	RESISTOR	4.7KΩ, 1/6W
	R643	QRD161J-222	RESISTOR	2.2KΩ, 1/6W
	R648	QRD163J-0R0	RESISTOR	0Ω, 1/6W
	RA601	QRB035J-103XC	RESISTOR ARRAY	
	C601	QEK61HM-105	E CAPACITOR	1.0μF, 50V
	C602	QCFB1EZ-223	CAPACITOR	0.022μF, 25V
	C603	QEK61EM-335	E CAPACITOR	3.3μF, 25V
	C604	QCC11EK-104	CAPACITOR	0.1μF, 25V
	C605	QEK60JM-107	E CAPACITOR	100μF, 6.3V
	C606	QCBB1HJ-121	CAPACITOR	120PF, 50V
	C607	QCBB1HJ-471	CAPACITOR	470PF, 50V
	C608	QETB1CM-337	E CAPACITOR	330μF, 16V
	C620	QCF11HP-473	CAPACITOR	0.047μF, 50V
	L601	PU59152-2R2J	COIL	2.2μH
⚠	CF601	PU60440	RESONATOR	
⚠	or	PU60440-2	RESONATOR	
	CN601	PEMC0722-017	WIRE TRAP (PARALLEL WIRE)	
	or	PEMC0753-017	WIRE TRAP	
	CN602	PU59555-4	CAP HOUSING	
	CN603	PU59555-7	CAP HOUSING	
	CN604	PU58844-9	CAP HOUSING	
	CN605	PU58844-3	CAP HOUSING	
⚠	CP601	ICP-F25	CIRCUIT PROTECTOR	

- REGULATOR SECTION -

L851	PU59152-100J	COIL	10μH
L853	PU59152-101J	COIL	100μH
⚠ TH801	PU52108-1R0	POSITIVE THERMISTOR	

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION
	CN801	PU61044-11	CAP HOUSING

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3. VIDEO UNIT BOARD ASSEMBLY <05>

	PWBA	PB10256A-04	VIDEO UNIT BOARD ASSEMBLY
	IC1	PB20166G-01	Y MODULE BOARD ASSY
⚠	IC2	MSM6967RS	IC
	IC201	PB20227A	COLOR MODULE BOARD
	IC251	BA7106LS	IC
	or	XRA7106LS	IC
	Q1	DTA144EU	TRANSISTOR
	Q2	2SC2412K	TRANSISTOR
	Q3	DTC144EK	TRANSISTOR
	Q4	2SA1037K	TRANSISTOR
	Q5	2SC2412K	TRANSISTOR
	Q201	2SC2412K	TRANSISTOR
	Q202	2SC2412K	TRANSISTOR
	Q203	DTC114WK	TRANSISTOR
	Q204	2SC2412K	TRANSISTOR
	Q205	2SA1037K	TRANSISTOR
	Q251	DTC114WK	TRANSISTOR
	D1	1SS133	DIODE
	or	MA165	DIODE
	D2	1SS133	DIODE
	or	MA165	DIODE
	D3	1SS133	DIODE
	or	MA165	DIODE
	D4	1SS133	DIODE
	or	MA165	DIODE
	D5	1SS292	DIODE
	D6	1SS133	DIODE
	or	MA165	DIODE
	D7	1SS133	DIODE
	or	MA165	DIODE
	D9	RD9.1ES-T1B2	ZENER DIODE
	or	UZ9.1BSB	ZENER DIODE
	D10	1SS133	DIODE
	or	MA165	DIODE
	D201	1SS133	DIODE
	or	MA165	DIODE
	D202	1SS133	DIODE
	or	MA165	DIODE
	D203	1SS133	DIODE
	or	MA165	DIODE
	D251	1SS133	DIODE
	or	MA165	DIODE
	D252	1SS133	DIODE
	or	MA165	DIODE
	D253	1SS133	DIODE
	or	MA165	DIODE
	R1	QRSA08J-103YN	RESISTOR 10KΩ, 1/10W
	R2	QRSA08J-102YN	RESISTOR 1.0KΩ, 1/10W
	R3	QRSA08J-681YN	RESISTOR 680Ω, 1/10W

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION
	R5	QRSA08J-562YN	RESISTOR 5.6KΩ, 1/10W
	R6	QRSA08J-103YN	RESISTOR 10KΩ, 1/10W
	R7	QRSA08J-104YN	RESISTOR 100KΩ, 1/10W
	R8	QRSA08J-273YN	RESISTOR 27KΩ, 1/10W
	R9	QRSA08J-394YN	RESISTOR 390KΩ, 1/10W
	R10	QRSA08J-103YN	RESISTOR 10KΩ, 1/10W
	R11	QRSA08J-221YN	RESISTOR 220Ω, 1/10W
	R12	QRSA08J-222YN	RESISTOR 2.2KΩ, 1/10W
	R13	QRSA08J-221YN	RESISTOR 220Ω, 1/10W
	R14	QRSA08J-222YN	RESISTOR 2.2KΩ, 1/10W
	R15	QRSA08J-102YN	RESISTOR 1.0KΩ, 1/10W
	R16	QVZ3518-222AZ	V RESISTOR, NC BALANCE 2.2KΩ
	or	QVZ3523-222AZ	V RESISTOR 2.2KΩ
	R17	QRSA08J-222YN	RESISTOR 2.2KΩ, 1/10W
	R18	QRSA08J-102YN	RESISTOR 1.0KΩ, 1/10W
⚠	R20	QRD161J-181	RESISTOR 180Ω, 1/6W
	R201	QRSA08J-183YN	RESISTOR 18KΩ, 1/10W
	R202	QRSA08J-332YN	RESISTOR 3.3KΩ, 1/10W
	R203	QRD161J-222	RESISTOR 2.2KΩ, 1/6W
	R204	QRSA08J-333YN	RESISTOR 33KΩ, 1/10W
	R205	QRD161J-223	RESISTOR 22KΩ, 1/6W
	R206	QRSA08J-102YN	RESISTOR 1.0KΩ, 1/10W
	R207	QRSA08J-102YN	RESISTOR 1.0KΩ, 1/10W
	R208	QRSA08J-682YN	RESISTOR 6.8KΩ, 1/10W
	R209	QRSA08J-391YN	RESISTOR 390Ω, 1/10W
	R210	QRSA08J-333YN	RESISTOR 33KΩ, 1/10W
	R211	QRSA08J-333YN	RESISTOR 33KΩ, 1/10W
	R212	QRSA08J-152YN	RESISTOR 1.5KΩ, 1/10W
	R213	QRSA08J-331YN	RESISTOR 330Ω, 1/10W
	R214	QRSA08J-222YN	RESISTOR 2.2KΩ, 1/10W
	R215	QRSA08J-332YN	RESISTOR 3.3KΩ, 1/10W
	R216	QRSA08J-102YN	RESISTOR 1.0KΩ, 1/10W
	R217	QRSA08J-393YN	RESISTOR 39KΩ, 1/10W
	R218	QRSA08J-332YN	RESISTOR 3.3KΩ, 1/10W
	R219	QRSA08J-102YN	RESISTOR 1.0KΩ, 1/10W
	R220	QRSA08J-102YN	RESISTOR 1.0KΩ, 1/10W
	R221	QRSA08J-102YN	RESISTOR 1.0KΩ, 1/10W
	R222	QRSA08J-391YN	RESISTOR 390Ω, 1/10W
	R223	QRSA08J-821YN	RESISTOR 820Ω, 1/10W
	R224	QRSA08J-471YN	RESISTOR 470Ω, 1/10W
	R251	QRSA08J-682YN	RESISTOR 6.8KΩ, 1/10W
	R252	QRSA08J-333YN	RESISTOR 33KΩ, 1/10W
	R253	QRD161J-273	RESISTOR 27KΩ, 1/6W
	R254	QRSA08J-914YN	RESISTOR 910KΩ, 1/10W
	R255	QRSA08J-103YN	RESISTOR 10KΩ, 1/10W
	R256	QRSA08J-104YN	RESISTOR 100KΩ, 1/10W
	C1	QCSA1HJ-220	CAPACITOR 22PF, 50V
	C2	QCFA1HZ-103	CAPACITOR 0.01μF, 50V
	C3	QCSA1HJ-151	CAPACITOR 150PF, 50V
	C4	QETC1AM-226	E CAPACITOR 22μF, 10V
	C5	QCYA1HK-102	CAPACITOR 0.001μF, 50V
	C6	QCFA1HZ-103	CAPACITOR 0.01μF, 50V
	C7	QETC1EM-335	E CAPACITOR 3.3μF, 25V
	C8	QEN60JM-336	NP E CAPACITOR 33μF, 6.3V
	C9	QETC1CM-106	E CAPACITOR 10μF, 16V
	C10	QCYA1HK-102	CAPACITOR 0.001μF, 50V

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	C11	QCYA1HK-102	CAPACITOR	0.001μF, 50V
	C12	QEN61HM-224	NP E CAPACITOR	0.22μF, 50V
	or	QENC1HM-224	NP E CAPACITOR	0.22μF, 50V
	C13	QCSA1HJ-120	CAPACITOR	12PF, 50V
	C14	QETC1EM-335	E CAPACITOR	3.3μF, 25V
	C15	QCVC1CN-103	CAPACITOR	0.01μF, 16V
	C16	QEN61HM-335	NP E CAPACITOR	3.3μF, 50V
	C17	QETC0JM-337	E CAPACITOR	330μF, 6.3V
	C18	QCFA1HZ-103	CAPACITOR	0.01μF, 50V
	C19	QEN61HM-225	NP E CAPACITOR	2.2μF, 50V
	C20	QCSA1HJ-120	CAPACITOR	12PF, 50V
	C21	QETC1EM-475	E CAPACITOR	4.7μF, 25V
	C22	QETC1EM-475	E CAPACITOR	4.7μF, 25V
	C23	QETC0JM-476	E CAPACITOR	47μF, 6.3V
	C24	QETC1HM-104	E CAPACITOR	0.1μF, 50V
	C25	QCFA1HZ-103	CAPACITOR	0.01μF, 50V
	C26	QCFA1HZ-103	CAPACITOR	0.01μF, 50V
	C27	QCFA1HZ-103	CAPACITOR	0.01μF, 50V
	C28	QCFA1HZ-103	CAPACITOR	0.01μF, 50V
	C29	QETC1AM-476	E CAPACITOR	47μF, 10V
	C201	QCSA1HJ-470	CAPACITOR	47PF, 50V
	C202	QCVB1CN-103	CAPACITOR	0.01μF, 16V
	C203	QCSA1HJ-820	CAPACITOR	82PF, 50V
	C204	QETC1HM-475	E CAPACITOR	4.7μF, 50V
	C205	QCVB1CN-103	CAPACITOR	0.01μF, 16V
	C206	QFN31HJ-224	M CAPACITOR	0.22μF, 50V
	C207	QFN31HJ-563	M CAPACITOR	0.056μF, 50V
	C208	QETC0JM-337	E CAPACITOR	330μF, 6.3V
	C209	QCC31CJ-223	CAPACITOR	0.22μF, 16V
	C210	QER60JM-107	E CAPACITOR	100μF, 6.3V
	C211	QER61CM-106	E CAPACITOR	10μF, 16V
	C212	QETC1HM-224	E CAPACITOR	2.2μF, 50V
	C213	QCFA1HZ-103	CAPACITOR	0.01μF, 50V
	C214	QCVB1CN-103	CAPACITOR	0.01μF, 16V
	C215	QETC1HM-474	E CAPACITOR	0.47μF, 50V
	C218	QCFA1HZ-103	CAPACITOR	0.01μF, 50V
	C219	QCC11CJ-473	CAPACITOR	0.047μF, 16V
	C220	QCBB1HJ-121	CAPACITOR	120PF, 50V
	C221	QCBB1HJ-102	CAPACITOR	0.001μF, 50V
	C222	QCSB1HJ-150	CAPACITOR	15PF, 50V
	C223	QCBB1HJ-102	CAPACITOR	0.001μF, 50V
	C251	QETC1CM-106	E CAPACITOR	10μF, 16V
	C252	QFN31HJ-471	M CAPACITOR	470PF, 50V
	C253	QCSA1HJ-270	CAPACITOR	27PF, 50V
	C254	QETC1HM-335	E CAPACITOR	3.3μF, 50V
	C255	QCYA1HK-472	CAPACITOR	0.0047μF, 50V
	C256	QCYA1HK-471	CAPACITOR	470PF, 50V
	C257	QCSA1HJ-5R0	CAPACITOR	5PF, 50V
	C258	QCFA1HZ-103	CAPACITOR	0.01μF, 50V
	C259	QCFA1HZ-103	CAPACITOR	0.01μF, 50V
	C260	QCFA1HZ-103	CAPACITOR	0.01μF, 50V
	C261	QCSA1HJ-220	CAPACITOR	22PF, 50V
	C262	QCFA1HZ-103	CAPACITOR	0.01μF, 50V
	C263	QETB0JM-477	E CAPACITOR	470μF, 6.3V
	C264	QCFA1HZ-103	CAPACITOR	0.01μF, 50V
	C265	QCFA1HZ-103	CAPACITOR	0.01μF, 50V

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	L1	PU59152-121J	COIL	120μH
	L2	PU59152-680J	COIL	68μH
	L3	PU48530-101K	COIL	100μH
	L4	PU59152-R22J	COIL	0.22μH
	L5	PU59152-101J	COIL	100μH
	L6	PU59152-R22J	COIL	0.22μH
	L201	PU48530-271J	COIL	270μH
	L202	PU59153-822J	COIL	8.1mH
⚠	L203	PU48530-151J	COIL	150μH
	L205	PU59152-150J	COIL	15μH
	L251	PU59152-330J	COIL	33μH
	L252	PU48530-101K	COIL	100μH
	EQ2	PU60162-2	EQUALIZER	
	or	PU60162	EQUALIZER	
	EQ201	PU53501-11	EQUALIZER	
	or	PU53501-6	EQUALIZER	
	LPF1	PU58021-3	LOW PASS FILTER	
	or	PU60715	LOW PASS FILTER	
	or	PU58021-2	LOW PASS FILTER	
	LPF2	PU60716	LOW PASS FILTER	
	LPF20	PU58022	LOW PASS FILTER	
	BPF201	PU60654	BAND PASS FILTER	
	or	PU60654-2	BAND PASS FILTER	
	BPF202	PU60713	BAND PASS FILTER	
	CF201	PU57073	CERAMIC FILTER	
	DL201	PU60340-2	COMB FILTER (2H DELAY LINE)	
	or	PU60490	COMB FILTER	
	or	PU58971-3	COMB FILTER	
	LC251	PU60655	COIL, SECAM DET	
⚠	X201	PU60653	CRYSTAL UNITS	
	SLD1	PQ42994	SHIELD PLATE	
	SLD2	PQ42995	SHIELD CASE	
	SLD3	PQ42996	SHIELD COVER	
	TP21	PU56347	TEST POINT	
	CN1	PU60330-113	CONNECTOR	
	CN2	PU60330-113	CONNECTOR	
	CN3	PU60330-110	CONNECTOR, (TERMINAL)	

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4. IF BOARD ASSEMBLY <07>

	PWBA	PB10242F	IF BOARD ASSEMBLY
	IC1	M51365SP	IC
	Q2	2SC3354	TRANSISTOR
	Q3	2SC1317(RS)	TRANSISTOR
	Q4	2SC1740(RS)	TRANSISTOR
	or	2SC3199(G)	TRANSISTOR
	or	2SC3311A(RS)	TRANSISTOR
	or	2SC536SPA(FG)	TRANSISTOR

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	Q5	2SC1740(RS)	TRANSISTOR	
	or	2SC3199(G)	TRANSISTOR	
	or	2SC3311A(RS)	TRANSISTOR	
	or	2SC536SPA(FG)	TRANSISTOR	
	Q6	2SA933S(RS)	TRANSISTOR	
	or	2SA1267(G)-TJK	TRANSISTOR	
	or	2SA1309AR,S	TRANSISTOR	
	Q7	2SC1740(RS)	TRANSISTOR	
	or	2SC3199(G)	TRANSISTOR	
	or	2SC3311A(RS)	TRANSISTOR	
	or	2SC536SPA(FG)	TRANSISTOR	
	Q9	2SD1450S,T	TRANSISTOR	
	or	2SD1468S(RSE)	TRANSISTOR	
	Q11	2SC1740(RS)	TRANSISTOR	
	or	2SC3199(G)JK	TRANSISTOR	
	or	2SC3311A(RS)	TRANSISTOR	
	or	2SC536SPA(FG)	TRANSISTOR	
	Q14	DTC144ES	TRANSISTOR	
	or	UN4213	TRANSISTOR	
	or	2SC3399	TRANSISTOR	
	D1	MTZ10B	ZENER DIODE	
	D5	SVC321SPA-B-1	V. DIODE	
	D6	1SS133	DIODE	
	D7	1SS133	DIODE	
	D8	1SS133	DIODE	
	R1	NRD718J-750NYU	RESISTOR	75Ω, 1/8W
	R4	NRD718J-392NYU	RESISTOR	3.9KΩ, 1/8W
	R6	NRD718J-182NYU	RESISTOR	1.8KΩ, 1/8W
	R8	NRD718J-681NYU	RESISTOR	680Ω, 1/8W
	R10	NRD718J-271NYU	RESISTOR	270Ω, 1/8W
	R11	NRD718J-820NYU	RESISTOR	82Ω, 1/8W
	R15	NRD718J-271NYU	RESISTOR	270Ω, 1/8W
	R17	NRD718J-562NYU	RESISTOR	5.6KΩ, 1/8W
	R18	NRD718J-332NYU	RESISTOR	3.3KΩ, 1/8W
	R19	NRD718J-222NYU	RESISTOR	2.2KΩ, 1/8W
	R20	NRD718J-222NYU	RESISTOR	2.2KΩ, 1/8W
	R21	QVZ3518-472	V RESISTOR, RF AGC	4.7KΩ
	or	QVZ3523-472	V RESISTOR	4.7KΩ
	R22	NRD718J-824NYU	RESISTOR	820KΩ, 1/8W
	R24	NRD718J-102NYU	RESISTOR	1.0KΩ, 1/8W
	R25	NRD718J-331NYU	RESISTOR	330Ω, 1/8W
	R27	NRD718J-104NYU	RESISTOR	100KΩ, 1/8W
	R28	NRD718J-104NYU	RESISTOR	100KΩ, 1/8W
	R31	NRD718J-222NYU	RESISTOR	2.2KΩ, 1/8W
	R32	NRD718J-103NYU	RESISTOR	10KΩ, 1/8W
	R33	NRD718J-223NYU	RESISTOR	22KΩ, 1/8W
	R34	NRD718J-470NYU	RESISTOR	47Ω, 1/8W
	R35	NRD718J-561NYU	RESISTOR	560Ω, 1/8W
	R36	NRD718J-561NYU	RESISTOR	560Ω, 1/8W
	R37	NRD718J-121NYU	RESISTOR	120Ω, 1/8W
	R38	NRD718J-182NYU	RESISTOR	1.8KΩ, 1/8W
	R39	NRD718J-272NYU	RESISTOR	2.7KΩ, 1/8W
	R40	QVZ3518-103	V RESISTOR, COLOR LEVEL	10KΩ
	or	QVZ3523-103	V RESISTOR	10KΩ
	R41	NRD718J-222NYU	RESISTOR	2.2KΩ, 1/8W
	R45	NRD718J-471NYU	RESISTOR	470Ω, 1/8W
	R46	NRD718J-104NYU	RESISTOR	100KΩ, 1/8W

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	R47	NRD718J-153NYU	RESISTOR	15KΩ, 1/8W
	R48	NRD718J-392NYU	RESISTOR	3.9KΩ, 1/8W
	R49	NRD718J-103NYU	RESISTOR	10KΩ, 1/8W
	R50	NRD718J-471NYU	RESISTOR	470Ω, 1/8W
	R51	NRD718J-223NYU	RESISTOR	22KΩ, 1/8W
	R52	NRD718J-223NYU	RESISTOR	22KΩ, 1/8W
	R53	NRD718J-103NYU	RESISTOR	10KΩ, 1/8W
	R54	NRD718J-682NYU	RESISTOR	6.8KΩ, 1/8W
	R57	NRD718J-153NYU	RESISTOR	15KΩ, 1/8W
	R73	NRD718J-331NYU	RESISTOR	330Ω, 1/8W
	R74	NRD718J-103NYU	RESISTOR	10KΩ, 1/8W
	R82	NRD718J-680NYU	RESISTOR	68Ω, 1/8W
	R83	NRD718J-331NYU	RESISTOR	330Ω, 1/8W
	R84	NRD718J-123NYU	RESISTOR	12KΩ, 1/8W
	R85	NRD718J-123NYU	RESISTOR	12KΩ, 1/8W
	R86	NRD718J-331NYU	RESISTOR	330Ω, 1/8W
	R87	NRD718J-222NYU	RESISTOR	2.2KΩ, 1/8W
	R88	NRD718J-103NYU	RESISTOR	10KΩ, 1/8W
	R90	NRD718J-103NYU	RESISTOR	10KΩ, 1/8W
	R95	QRD162J-470	RESISTOR	47Ω, 1/6W
	R97	NRD718J-102NYU	RESISTOR	1.0KΩ, 1/8W
	R101	NRD718J-152NYU	RESISTOR	1.5KΩ, 1/8W
	R102	NRD718J-222NYU	RESISTOR	2.2KΩ, 1/8W
	R103	NRD718J-681NYU	RESISTOR	680Ω, 1/8W
	R104	QRD161J-393	RESISTOR	39KΩ, 1/6W
	R105	NRD718J-102NYU	RESISTOR	1.0KΩ, 1/8W
	C5	NCB71HK-102NYR	CAPACITOR	0.001μF, 50V
	C6	NCX71CM-222NYR	CAPACITOR	0.0022μF, 16V
	C7	NCB71HK-102NYR	CAPACITOR	0.001μF, 50V
	C8	NCB71HK-102NYR	CAPACITOR	0.001μF, 50V
	C10	QETC1CM-336	E CAPACITOR	33μF, 16V
	C11	NCY71CM-103NYR	CAPACITOR	0.01μF, 16V
	C13	NCX71CM-222NYR	CAPACITOR	0.0022μF, 16V
	C14	PU57601-474ME	E CAPACITOR	0.47μF
	C15	QETC1CM-336	E CAPACITOR	33μF, 16V
	C16	NCX71CM-222NYR	CAPACITOR	0.0022μF, 16V
	C17	NCF71EZ-223NYR	CAPACITOR	0.022μF, 25V
	C19	NCY71CM-103NYR	CAPACITOR	0.01μF, 16V
	C20	NCY71CM-103NYR	CAPACITOR	0.01μF, 16V
	C21	NCB71HK-101NYR	CAPACITOR	100PF, 50V
	C22	QETC1HM-105	E CAPACITOR	1.0μF, 50V
	C23	QCC11EK-223	CAPACITOR	0.022μF, 25V
	C24	QETC1HM-105	E CAPACITOR	1.0μF, 50V
	C25	NCX71CM-222NYR	CAPACITOR	0.0022μF, 16V
	C27	QETC1HM-474	E CAPACITOR	0.47μF, 50V
	C28	NCS71HJ-100NYR	CAPACITOR	10PF, 50V
	C29	NCS71HJ-470NYR	CAPACITOR	47PF, 50V
	C31	QETC1HM-335	E CAPACITOR	3.3μF, 50V
	C32	NCF71EZ-223NYR	CAPACITOR	0.022μF, 25V
	C33	QETC1HM-474	E CAPACITOR	0.47μF, 50V
	C50	QETC1CM-336	E CAPACITOR	33μF, 16V
	C51	NCB71HK-101NYR	CAPACITOR	100PF, 50V
	C52	QETC1CM-336	E CAPACITOR	33μF, 16V
	C56	QETC1CM-336	E CAPACITOR	33μF, 16V
	C57	QEN41CM-336	NP E CAPACITOR	33μF, 16V
	or	QEN61CM-336	NP E CAPACITOR	33μF, 16V
	C58	NCS71HJ-100NYR	CAPACITOR	10PF, 50V

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	L2	PU60025-1R0	COIL	1μH
	L3	PU60025-2R0	COIL	2μH
	L4	PU59152-8R2J	COIL	8.2μH
	L5	PU59152-220J	COIL	22μH
	L6	PU59152-6R8K	COIL	6.8μH
	L7	PU59152-R22K	COIL	0.22μH
	L9	PU59152-6R8K	COIL	6.8μH
	CF1	PU60774-4	CERAMIC FILTER, 6.5MHZ	
	CF3	PU32990-2	CERAMIC FILTER, 5.5MHZ	
	CF5	PU32990-4	CERAMIC FILTER, 6.5MHZ	
	CF6	PU60774-2	CERAMIC FILTER, 5.5MHZ	
	SAW1	PU35557-6	SAW FILTER	
	T2	PU60497	IF.TRANSFORMER, VCO 38.9MHZ	
	T3	PU60864	IF.TRANSFORMER, AFC 38.9MHZ	
	T4	PU60955	IF.TRANSFORMER, SOUND DET5.5MHZ	
	T5	PU60046	IF.TRANSFORMER	
	JP1	PU59935-16	TERMINAL	

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5. TUNER CONTROL BOARD ASSEMBLY <08>

	PWBA PB20361C		TUNER CTL BOARD ASSEMBLY	
⚠	TNR1	PERF0019	TUNER	
	IC1	AN1358	IC	
	or	M5223P	IC	
	IC2	CAT93C46P	IC	
	Q2	2SD1863(QR)	TRANSISTOR	
	or	2SC3243D,E	TRANSISTOR	
	Q3	2SB810H,J	TRANSISTOR	
	Q4	DTC144ES	TRANSISTOR	
	or	UN4213	TRANSISTOR	
	or	2SC3399	TRANSISTOR	
	Q5	2SC1740(S)	TRANSISTOR	
	or	2SC3311A(S)	TRANSISTOR	
	or	2SC536SPA(G)	TRANSISTOR	
	Q7	UN4319VI	TRANSISTOR	
	Q8	UN4319VI	TRANSISTOR	
	Q9	UN4319VI	TRANSISTOR	
	D1	HZT33-02	ZENER DIODE	
	D2	E-103	DIODE	
	D3	RD5.6ES-T1B1	ZENER DIODE	
	or	MTZ5.6A	ZENER DIODE	
	D4	1SS133	DIODE	
	D5	1SS133	DIODE	
	R1	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R2	QRD161J-104	RESISTOR	100KΩ, 1/6W
	R7	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
	R8	QRD161J-153	RESISTOR	15KΩ, 1/6W
	R9	QRD161J-182	RESISTOR	1.8KΩ, 1/6W
	R10	QRD161J-103	RESISTOR	10KΩ, 1/6W

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	R11	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R12	QRD161J-333	RESISTOR	33KΩ, 1/6W
	R13	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R14	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R15	QRD161J-153	RESISTOR	15KΩ, 1/6W
	R16	QRD161J-154	RESISTOR	150KΩ, 1/6W
	R17	QRD161J-154	RESISTOR	150KΩ, 1/6W
	R18	QRD161J-394	RESISTOR	390KΩ, 1/6W
	R19	QRD161J-331	RESISTOR	330Ω, 1/6W
	R20	QRD161J-333	RESISTOR	33KΩ, 1/6W
	R21	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R22	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R33	QRD161J-472	RESISTOR	4.7KΩ, 1/6W
	R35	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R36	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R37	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R38	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R39	QRD161J-472	RESISTOR	4.7KΩ, 1/6W
	R40	QRD161J-472	RESISTOR	4.7KΩ, 1/6W
	R41	QRD161J-472	RESISTOR	4.7KΩ, 1/6W
	C1	QETC1CM-336	E CAPACITOR	33μF, 16V
	C2	QEK61HM-225	E CAPACITOR	2.2μF, 50V
	C3	QETC1HM-105	E CAPACITOR	1.0μF, 50V
	C12	QCBB1HK-102	CAPACITOR	0.001μF, 50V
	C13	QETC1CM-336	E CAPACITOR	33μF, 16V
	C14	QETC1CM-336	E CAPACITOR	33μF, 16V
	C15	QETC1CM-107	E CAPACITOR	100μF, 16V
	C16	QETC1CM-106	E CAPACITOR	10μF, 16V
	C17	QCSB1HJ-100	CAPACITOR	10PF, 50V
	C18	QFV71HJ-153	TF CAPACITOR	0.015μF, 50V
	C19	QFV71HJ-333	TF CAPACITOR	0.033μF, 50V
	C20	QFV71HJ-153	TF CAPACITOR	0.015μF, 50V
	C21	QFV71HJ-333	TF CAPACITOR	0.033μF, 50V
	C22	QCVB1CM-103	CAPACITOR	0.01μF, 16V
	C23	QETC1HM-106	E CAPACITOR	10μF, 50V
	C27	QETC1CM-106	E CAPACITOR	10μF, 16V
	C28	QEK61HM-474	E CAPACITOR	0.47μF, 50V
	C30	QETC1CM-106	E CAPACITOR	10μF, 16V
	C31	QETC1CM-106	E CAPACITOR	10μF, 16V
	C32	QETC1CM-106	E CAPACITOR	10μF, 16V
	L1	PU59152-R22K	COIL	0.22μH
	L2	PU59152-6R8J	COIL	6.8μH
	or	PU59152-6R8K	COIL	6.8μH
	L5	PU59152-100J	COIL	10μH
	L7	PU59152-2R7K	COIL	2.7μH
	HD1	PU36416-1-3	HOLDER	
	CN1	PU58844-7	CAP HOUSING	
	CN2	PU58844-12	CAP HOUSING	
⚠	CP1	ICP-F10	CIRCUIT PROTECTOR	

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION

6. AUDIO CONTROL HEAD BOARD <12>

	PWB1	PB40068	AUDIO CONTROL HEAD BOARD
	CN1	PU58844-107	CAP HOUSING

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7. TIMER/DISPLAY/SW BOARD ASSY <21>

	PWBA	PB10352J	TIMER/DISPLAY/SW BOARD ASSY
	IC1	UPD75216ACW-B04	IC
	or	UPD75P216ACWB04	IC
	IC2	IC-PST523H-2	IC
	IC101	GP1U541X	INFRARED RAYS UNIT
	or	GP1U521	INFRARED RAYS UNIT
	or	GP1U521X	INFRARED RAYS UNIT
	Q1	2SC3199(G)-TJK	TRANSISTOR
	or	2SC3311A(RS)	TRANSISTOR
	D1	RD9.1ES-T1B2	ZENER DIODE
	D2	1SS133	DIODE
	D3	1SS133	DIODE
	D4	11ES2	DIODE
	D5	11ES2	DIODE
	D6	11ES2	DIODE
	or	ERA15-02	DIODE
	D101	SLH-56VC3F	LE DIODE, POWER
	D102	SLH-34MC3F	LE DIODE, PLAY
	D103	SLH-34DC3F	LE DIODE, PAUSE
	D104	SLH-34VC3F	LE DIODE, REC
	D105	SLH-34MC3F	LE DIODE, AUTO TRACK
	D111	1SS132	DIODE
	D112	1SS132	DIODE
	D115	1SS132	DIODE
	D116	1SS132	DIODE
	D117	1SS132	DIODE
	D118	1SS132	DIODE
	D123	1SS132	DIODE
	D124	1SS132	DIODE
	D129	1SS132	DIODE
	D140	1SS132	DIODE
	R1	QRD161J-103	RESISTOR 10KΩ, 1/6W
	R2	QRD161J-472	RESISTOR 4.7KΩ, 1/6W
	R3	QRD161J-273	RESISTOR 27KΩ, 1/6W
	R4	QRD161J-682	RESISTOR 6.8KΩ, 1/6W
	R5	QRD161J-333	RESISTOR 33KΩ, 1/6W
	R6	QRD161J-333	RESISTOR 33KΩ, 1/6W
	R7	QRD162J-102	RESISTOR 1.0KΩ, 1/6W
	R8	QRD161J-103	RESISTOR 10KΩ, 1/6W
	R9	QRD161J-103	RESISTOR 10KΩ, 1/6W
	R10	QRD161J-103	RESISTOR 10KΩ, 1/6W

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION
	R11	QRD161J-103	RESISTOR 10KΩ, 1/6W
	R12	QRD161J-333	RESISTOR 33KΩ, 1/6W
	R13	QRD161J-271	RESISTOR 270Ω, 1/6W
	R14	QRD161J-271	RESISTOR 270Ω, 1/6W
	R15	QRD161J-103	RESISTOR 10KΩ, 1/6W
	R16	QRD161J-103	RESISTOR 10KΩ, 1/6W
	R17	QRD161J-472	RESISTOR 4.7KΩ, 1/6W
	R25	QRD161J-103	RESISTOR 10KΩ, 1/6W
	R26	QRD161J-103	RESISTOR 10KΩ, 1/6W
	R30	QRD161J-224	RESISTOR 220KΩ, 1/6W
	R31	QRD161J-151	RESISTOR 150Ω, 1/6W
	R32	QRD161J-271	RESISTOR 270Ω, 1/6W
	R33	QRD161J-271	RESISTOR 270Ω, 1/6W
	R101	QRD161J-271	RESISTOR 270Ω, 1/6W
	R102	QRD161J-271	RESISTOR 270Ω, 1/6W
	R103	QRD161J-271	RESISTOR 270Ω, 1/6W
	R104	QRD161J-271	RESISTOR 270Ω, 1/6W
	R105	QRD161J-271	RESISTOR 270Ω, 1/6W
	RA1	QRB047J-333	RESISTOR ARRAY
	or	QRB049J-333	RESISTOR ARRAY
	RA2	QRB077J-104	RESISTOR ARRAY
	or	QRB079J-104	RESISTOR ARRAY
	C3	QCVC1CN-103	CAPACITOR 0.01μF, 16V
	C4	QER61CM-106	E CAPACITOR 10μF, 16V
	C5	QEA40HZ-105	E CAPACITOR 1F, 5.5V
	C6	QAT3123-200	TRIMMER CAP, TIMER CLOCK 20PF
	C7	QCSB1HJ-120	CAPACITOR 12PF, 50V
	C11	QER61CM-106	E CAPACITOR 10μF, 16V
	C13	QCVB1CN-103	CAPACITOR 0.01μF, 16V
	C14	QER61HM-106	E CAPACITOR 10μF, 50V
	C15	QCBB1HJ-101	CAPACITOR 100PF, 50V
	C16	QCBB1HJ-101	CAPACITOR 100PF, 50V
	C17	QCF11HP-473	CAPACITOR 0.047μF, 50V
	C18	QER61CM-106	E CAPACITOR 10μF, 16V
	C19	QER61CM-106	E CAPACITOR 10μF, 16V
	C21	QCC11EJ-473	CAPACITOR 0.47μF, 25V
⚠	X1	PU60226-4	CRYSTAL RESONATOR
	S1	PU60392-1-2Z	TACT SW, POWER
	S2	PU60392-2-2	TACT SW, STOP/EJECT
	S3	PU60392-2-2	TACT SW, FF/SEARCH +
	S4	PU60392-2-2	TACT SW, REW/SEARCH -
	S6	PU60392-1-2Z	TACT SW, REC/1TR
	S7	PU60392-2-2	TACT SW, PLAY/X2
	S8	PU60392-1-2Z	TACT SW, PAUSE
	S18	PU60392-2-2	TACT SW, ADJ/PROG/CH PLUS
	S19	PU60392-2-2	TACT SW, ITR (START)
	S21	PU60392-2-2	TACT SW, CANCEL/SKIP/RESET
	S22	PU60392-2-2	TACT SW, REPEAT/STORE/C. MEM
	S23	PU60392-2-2	TACT SW, SELECT/SUMMER TIME
	S24	PU60392-2-2	TACT SW, TIMER
	S25	PU60392-2-2	TACT SW, SET +/TRACK +
	S26	PU60392-2-2	TACT SW, SET -/TRACK -
	S28	PU60392-2-2	TACT SW, DISPLAY OFF
	S30	PU60392-2-2	TACT SW, CH SET
	S32	PU60392-2-2	TACT SW, CNT/REM/DATE

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION
	S49	PU60392-2-2Z	TACT SW, CH+
	S50	PU60392-2-2Z	TACT SW, CH-
	S403	PU58486-1-1	SLIDE SW, AFC
	S405	PU58487-1-1	SLIDE SW, REPEAT
⚠	FDP1	PEDP0008-04	FLUORESCENT DISPLAY PANEL
	CL1	PU56729-2	WIRE CLAMP
	HD1	PQ31331-1-1	FDP HOLDER (R)
	HD2	PQ31330-1-1	FDP HOLDER (L)
	HD3	PQM30038-2-2	LED HOLDER, X4
	HD4	PQ40795-2-2	LED HOLDER, FOR D101
	TP1	PU56008	TEST-PIN
	CN1	PU58844-104	CAP HOUSING
	CN2	PU59555-7	CAP HOUSING
⚠	CP1	ICP-F10	CIRCUIT PROTECTOR

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8. UPPER DRUM BOARD <41>

PWB1	PDM3017	BOARD (UPPER DRUM)

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9. PRE/REC AMP BOARD ASSEMBLY <43>

PWBA	PB10257J	PRE/REC BOARD ASSEMBLY	
IC1	AN3380K	IC	
or	AN3380NK	IC	
Q1	2SA1309R, S	TRANSISTOR	
Q2	2SC1740S(RS)	TRANSISTOR	
or	2SC3199(GB)-TJK	TRANSISTOR	
Q3	2SC1740S(RS)	TRANSISTOR	
or	2SC3199(GB)-TJK	TRANSISTOR	
Q4	2SC1740S(RS)	TRANSISTOR	
or	2SC3199(GB)-TJK	TRANSISTOR	
Q5	DTC144WS	TRANSISTOR	
R1	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
R2	QRD161J-222	RESISTOR	2.2KΩ, 1/6W
R3	QRD161J-222	RESISTOR	2.2KΩ, 1/6W
R4	QRD161J-391	RESISTOR	390Ω, 1/6W
R5	QRD161J-391	RESISTOR	390Ω, 1/6W
R6	QRD161J-821	RESISTOR	820Ω, 1/6W
R7	QRD161J-222	RESISTOR	2.2KΩ, 1/6W
R8	QRD161J-222	RESISTOR	2.2KΩ, 1/6W
R9	QRD161J-102	RESISTOR	1.0KΩ, 1/6W
R10	QRD161J-122	RESISTOR	1.2KΩ, 1/6W

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	R11	QRD161J-561	RESISTOR	560Ω, 1/6W
	R12	QRD161J-821	RESISTOR	820Ω, 1/6W
	R13	QRD161J-122	RESISTOR	1.2KΩ, 1/6W
	R14	QRD161J-332	RESISTOR	3.3KΩ, 1/6W
	R15	QRD161J-103	RESISTOR	10KΩ, 1/6W
	R16	QRD161J-562	RESISTOR	5.6KΩ, 1/6W
	R17	QRD161J-153	RESISTOR	15KΩ, 1/6W
	R19	QRD161J-561	RESISTOR	560Ω, 1/6W
	R20	QRD161J-391	RESISTOR	390Ω, 1/6W
	R21	QRD161J-151	RESISTOR	150Ω, 1/6W
	R22	QRD161J-151	RESISTOR	150Ω, 1/6W
	R23	QRV144F-3742AY	RESISTOR	370KΩ, 1/4W
	R24	QRD161J-560	RESISTOR	56Ω, 1/6W
	C1	QER61CM-476	E CAPACITOR	47μF, 16V
	C2	QCVB1CN-103	CAPACITOR	0.01μF, 16V
	C3	QCBB1HJ-121	CAPACITOR	120PF, 50V
	C4	QCVB1CN-103	CAPACITOR	0.01μF, 16V
	C5	QCSB1HJ-270	CAPACITOR	27PF, 50V
	C6	QCSB1HK-3R9	CAPACITOR	3.9PF, 50V
	C7	QCVB1CN-103	CAPACITOR	0.01μF, 16V
	C8	QCSB1HJ-360	CAPACITOR	36PF, 50V
	C9	QCSB1HJ-120	CAPACITOR	12PF, 50V
	C11	QCVB1CN-103	CAPACITOR	0.01μF, 16V
	C12	QFV41HJ-104	TF CAPACITOR	0.1μF, 50V
	C13	QER51CM-476	E CAPACITOR	47μF, 16V
	C14	QEE41AM-335	TANTAL CAPACITOR	3.3μF, 10V
	C15	QCSB1HJ-680	CAPACITOR	68PF, 50V
	C16	QCVB1CN-103	CAPACITOR	0.01μF, 16V
	C17	QFV41HJ-104	TF CAPACITOR	0.1μF, 50V
	C18	QER61CM-106	E CAPACITOR	10μF, 16V
	C19	QCBB1HJ-820	CAPACITOR	82PF, 50V
	C20	QCBB1HJ-820	CAPACITOR	82PF, 50V
	C21	QER61CM-106	E CAPACITOR	10μF, 16V
	C22	QCVB1CN-103	CAPACITOR	0.01μF, 16V
	C23	QEE40JM-685	TANTAL CAPACITOR	6.8μF, 6.3V
	L1	PU48530-101J	COIL	100μH
	L2	PU59988-680J	COIL	68μH
	L3	PU59988-470J	COIL	47μH
	L4	PU59988-330J	COIL	33μH
	L5	PU59988-390J	COIL	39μH
	L6	PU48530-101J	COIL	100μH
	L7	PU59988-150J	COIL	15μH
	L8	PU59988-6R8J	COIL	6.8μH
	L9	PU59988-120J	COIL	12μH
	SLD1	PQ32216-1-1	SHIELD CASE(1)	
	CN1	PU58844-106	CAP HOUSING	
	CN2	PU59555-104	CAP HOUSING	
	CN3	PU59973-4	CAP HOUSING	

#⚠ REF No.	PART No.	PART NAME, DESCRIPTION		#⚠ REF NO.	PART NO.	PART NAME, DESCRIPTION

10. DECK TERMINAL BOARD ASSEMBLY <51>

PWBA	PB10320A-02	DECK TERMINAL BOARD ASSEMBLY	
Q1	PU60625	END SENSOR	
R1	QRD161J-202	RESISTOR	2.0KΩ, 1/6W
R3	QRD161J-331	RESISTOR	330Ω, 1/6W
R4	QRD161J-331	RESISTOR	330Ω, 1/6W
R5	QRD161J-331	RESISTOR	330Ω, 1/6W
R7	QRD161J-202	RESISTOR	2.0KΩ, 1/6W
R8	NTH5D473KB	THERMISTOR	
or	ERT-D2ZHK473S	NEGA THERMISTOR	
C1	QCVB1CM-103	CAPACITOR	0.01μF, 16V
PS1	PS5705HR	PHOTO INTERRUPTER	
PS2	PS5705HR	PHOTO INTERRUPTER	
CN1	PEMC0722-017	WIRE TRAP	
or	PEMC0753-017	WIRE TRAP	
CN2	PU60642	CONNECTOR, (7PIN)	
CN3	PU60640	CONNECTOR, (4PIN)	

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11. LOADING MDA BOARD ASSEMBLY <55>

	PWBA2	PB10320A2-01	LOADING MDA BOARD ASSY	
⚠	IC1	BA6418N	IC	
⚠	or	XRA6418N	IC	
	C1	QETA1CM-336	E CAPACITOR	33μF, 16V
	CN1	PU59555-104	CAP HOUSING	

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12. CASSETTE HOUSING BOARD <56>

PWB1	PB40041-01-01	CASSETTE HOUSING BOARD	
Q2	PN268VI-NC	PHOTO TRANSISTOR	
C1	QCC11EJ-103	CAPACITO	0.01μF, 25V
PHS3	PU60629	CASSETTE SENSOR	
CN2	PU60639	CONNECTOR (4P)	

SECTION 6
TECHNICAL INFORMATIONS

6.1 CIRCUIT CONTROL SYSTEM

1. IC601 pin function (Mechacon)

Pin No.	Symbol	I/O format	Label	I/O	Contents
1	Port 6 3	C-MOS	LCM1	O	LOADING MOTOR DRIVE
2	Port 6 2		LCM2		
3	Port 6 1		DRUM CTL	O	SPECIAL PB H CORRECTION
4	Port 6 0		CAP CTL		CAPSTAN MOTOR SERVO (FF/REW MODE)
5	Port 4 7	N-ch OPEN DRAIN	FM DET	I	AVERAGE FM (AUTO TRACKING DATA)
6	Port 4 6		THERM		THERMIC CORRECTION
7	Port 4 5		MODE SENS 1	I	MECHANISM MODE DETECTION
8	Port 4 4		MODE SENS 2		
9	Port 3 7		MODE SENS 3		
10	Port 3 6		CLK	I	TM (TIMER/M-CTL CPU) bus Data : CLOCK : 16 bit
11	Port 3 5		DATA	I/O	
12	Port 3 4		REC SF	I	REC SAFETY SW ON: L
13	Port 3 3		CAP REV	O	CAPSTAN MOTOR REV MODE: L
14	Port 3 2		SERVO	O	CAPSTAN MOTOR SERVO
15	Port 3 1		CAP FG	I	MODE DETECT, BACK SPACE COUNT, TAPE REMAIN
16	Port 3 0		CTL PULSE	I	MODE DETECT, BLANK DETECT
17	Port 5 7	C-MOS	PWM	O	TUNING DATA OUTPUT
18	Port 5 6		PAUSE	O	CAPSTAN MOTOR SERVO (CAPSTAN BRAKE)
19	Port 5 5		NC	–	NC
20	Port 5 4		V PULSE	O	V PULSE OUTPUT (V JITTER CORRECTION)
21	P5 3/T/ED3		DFF	I	DRUM ROTATION DETECT/REC TIMING CONTROL (HEAD SW)
22	CN Vss	–	CN Vss	I	GND (ALWAYS GND)
23	RESET		RESET		RESET AT CONNECT VCR TO AC
24	X IN		X IN	I	MAIN SYSTEM CLOCK (8 MHz)
25	X OUT		X OUT	O	
26	Vss		Vss	–	GND
27	Port 5 2	C-MOS	START SENS	I	START SENSOR, LEADER TAPE DETECT (DET ON: L)
28	Port 5 1		TU FG	I	REEL ROTATION DETECT, TAPE REMAIN
29	Port 5 0		SP FG		
30	Port 1 5	N-ch OPEN DRAIN	R. PAUSE	I	REMOTE PAUSE (PAUSE ON: L)
31	Port 1 4		CASS	I	CASSETTE SENSOR (CASS IN: ⎍⎍)
32	Port 1 3		AUX	O	AUX MODE: L
33	Port 1 2		END SENS	I	END SENSOR, TRAILER TAPE DETECT (DET ON: L)
34	Port 1 1		REC START	O	REC START: L
35	Port 1 0		REC	O	REC MODE: L
36	Port 0 7		EE	O	EE MODE: L
37	Port 0 6		P CTL		POWER CONTROL (PWR ON: L)
38	Port 0 5		P MUTE		PICTURE MUTE CONTROL (MUTE ON: L)
39	Port 0 4		SP		SP MODE: L (NOT USED)
40	Port 0 3		SYNC DET	I	SYNC DETECT (No signal: H)/PICTURE MUTE CONTROL
41	Port 0 2		AFC DET	O	AFC CONTROL (ON/OFF)
42	Port 0 1		TEXT		TEXT MODE: L
43	Port 0 0		A MUTE		AUDIO MUTE CONTROL (MUTE ON: H)
44	Port 2 7	C-MOS	V UP	O	MOTOR DRIVE VOLTAGE CONTROL (Norm: L)
45	Port 2 6		EXP DATA		12 bit Serial data (TNR BAND SELECT)
46	Port 2 5		TNR CTL		TUNER CTL (ON: H)
47	Port 2 4		M CE	O	MEMORY IC CHIP ENABLE
48	Port 2 3		M DATA	I/O	MEMORY DATA WRITE/READ
49	Port 2 2		S/M/P CLK	O	CLOCK
50	Port 2 1		S. DATA	O	SERVO IC CONTROL DATA
51	Port 2 0		INDEX	I/O	INDEX DATA WRITE/READ (ON: L)
52	Vcc		Vcc	I	for the SYSTEM CONTROL

Table 6-1 IC601 pin functions

2. IC1 pin function (Timer)

Pin No.	Symbol	Label	I/O	Contents
1	S3	Sd		
2	S2	Sc	O	SEGMENT DISPLAY DATA /KEY SCAN PULSE OUTPUT
3	S1	Sb		
4	S0	Sa		/KEY SCAN PULSE OUTPUT
5	P00/INT4	POWER DOWN	I	POWER DOWN DETECT (DETECT ON: L)
6	P01/SCK	NC	–	NC
7	P02/SD	NC		
8	P03/SI	TEST	I	TEST POINT (CLOCK ADJUST/FDP CHECK/X10 SPEED set)
9	P10/INT0	REMOTE	I	REMOTE DATA 16 bit SERIAL DATA (A/B code)
10	P11/INT1	NC	–	NC
11	P12/INT2	NC		
12	P13/T10	CNT PLS	I	COUNTER DATA
13	P20	KS0		
14	P21	KS1	I	KEY SCAN DATA INPUT
15	P22	KS2		
16	P23/BUZ	KS3		
17	P30	TIMER DATA	I/O	TM (TIMER/M-CTL CPU) bus : 16 bit DATA
18	P31	TIMER CLK	O	: CLOCK
19	P32	SDA	I/O	VIDEO PROGRAMING SYSTEM: I² C Bus
20	P33	SCL	O	VIDEO PROGRAMING SYSTEM: CLOCK
21	P60	NC		
22	P61	NC	–	NC
23	P62	NC		
24	P63	NC		
25	P40	POWER		
26	P41	PLAY	O	LED DRIVE (LED ON: L)
27	P42	PAUSE		
28	P43	REC		
29	PP0	NC	–	NC
30	X1	X1	I	MAIN SYSTEM CLOCK (4.19 MHz)
31	X2	X2	O	
32	Vss	Vss	–	GND
33	XT1	XT1	I	GND (ALWAYS GND)
34	XT2	NC		
35	P50	NC	–	NC
36	P51	NC		
37	P52	AUTO TRACK	O	LED DRIVE (LED ON: L)
38	P53	NC	–	NC
39	RESET	RESET	I	RESET AT CONNECT VCR TO AC
40	T0	4G		
41	T1	5G		
42	T2	6G		
43	T3	7G		
44	T4	1G	O	COLUMN DISPLAY DATA
45	T5	2G		
46	T6	3G		
47	T7	8G		
48	T8	9G		
49	T9	10G	–	NC
50	T10/S15/PH3	SP		
51	T11/S14/PH2	So		
52	T12/S13/PH1	Sn	O	SEGMENT DISPLAY DATA /KEY SCAN PULSE OUTPUT
53	T13/S12/PH0	Sm		/KEY SCAN PULSE OUTPUT
54	T14/S11	Sl		
55	T15/S10	Sk		
56	V_{LOAD}	V_{LOAD}	I	−30V For the FDP DRIVE
57	V_{PRE}	V_{PRE}		−5V
58	S9	Sj		
59	S8	Si		
60	S7	Sh	O	/KEY SCAN PULSE OUTPUT
61	S6	Sg		SEGMENT DISPLAY DATA /KEY SCAN PULSE OUTPUT
62	S6	Sf		/KEY SCAN PULSE OUTPUT
63	S4	Se		/KEY SCAN PULSE OUTPUT
64	V_{DD}	V_{DD}	I	5V For the SYSTEM CONTROL

Table 6-2 IC1 pin functions